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MODERN TRANSPORT

"THE TIMES" OF THE TRANSPORT WORLD

LONG WELDED RAILS IN N.E. REGION

See Page 3

VOL. LXXX No. 2078 [*Registered at the G.P.O. as a newspaper*] LONDON, JANUARY 24, 1959 PRICE NINEPENCE

CURRENT TOPICS

Short Way to the Continent

TURNROUND time on Continental commercial vehicle ferry service, especially where accompanied vehicles are concerned, can be an important economic factor. A ferry crossing which normally should not exceed 2½ hours, coupled with easy access to the industrial north of France, the Benelux countries and Western Germany, not to mention the South of France and Mediterranean countries, and low port charges, would seem to render certain the success of the new Dover—Calais service of European Ferries, Limited, which commenced this week. The *Empire Shearwater* will take up to 80 commercial vehicles, also (on its upper deck) trailers, containers or pallets and, using a new berth at the eastern arm of Dover Harbour with its own Customs shed and parking compound, should experience no interference from the nearby car ferry operated by the associated Townsend Brothers Ferries. Both companies are subsidiaries of Townsend Ferries and Shipping, Limited. With a probable turnround time for the ferry itself of only 9 hours it is not impossible that the thrice-weekly schedule could be intensified even to twice daily if departure times suitable to vehicle operators could be found. Initially the ferry departs from Dover at 11 a.m., but an earlier start may assist some users. The lower charges at Dover and Calais, says Mr. G. S. Nott, chairman of the new company, can result in as much as £20 difference in the cost of sending a single lorry or semi-trailer on a return trip. The French authorities have proved co-operative in arrangements for vehicles to enter under the carnet TIR; also, steps are being taken to mount a groupage service for small lots. The local *syndicat* of hauliers in Lille is providing tractor units for the haulage of semi-trailers to any desired destination.

Improving Freight Facilities

AN important step towards the better handling of freight traffic in the Lincolnshire area came into effect on January 17, when the completely modernised Holmes Yard goods depot at Lincoln was officially opened by Sir Reginald Wilson, chairman of the Eastern Area Board of the B.T.C. Speaking to an invited audience which included the Bishop of Lincoln, the Mayor, the president of the local chamber of commerce, and a representative body of local business men, Sir Reginald expressed his conviction that the improved facilities would prove an immense benefit to the community, and that the new goods shed and its installations, together with the two-day public exhibition of rolling stock and freight handling equipment, would emphasise the importance which the railways attached to this side of the business. The opening ceremony took place in the new shed, a remarkable structure measuring 368 ft. by 140 ft., with a clear floor space throughout. The mechanised equipment includes a raised slat conveyor 320 ft. in length which provides direct communication between the loaded wagons and 28 berths for cartage vehicles. Another innovation is that all wagon movements from the sidings and within the shed are performed by an Epping Auto Tractor, and that from now on, with a roofed area of well over an acre, all loading and unloading, with the exception of full load traffic, will take place under cover. Some 51 rail wagons can be loaded direct from road vehicles.

A Valuable Exhibition

INHERENTLY there is nothing new in the idea of promoting exhibitions as a means of publicising new achievements, but so far as railways are concerned, it is not often that they are sponsored with the specific purpose of focusing public attention on a new local improvement. In this respect the exhibition at Lincoln, held on the occasion of the opening of the new depot, suggests an approach which is ideally suited to the needs of railway publicity, and which could if properly exploited, become a basis for wider public interest in local railway affairs. In ordinary circumstances the opening of a new goods depot, however much it might stand to serve the public weal, cannot be expected to excite much public interest. Yet stage an exhibition of rolling stock, including the record breaking Pacific locomotive *Mallard*, and the latest devices for mechanical handling, in the same depot, and in a fraction of the time that it takes to raise steam half the town will be clamouring for admission. The business man who comes from Grimsby to examine an insulated fish wagon won't deny himself the pleasure of standing on the footplate any more than the local schoolboy, and even the bored condescension of wives and mothers can turn to genuine interest when confronted with the compact intricacies of a kitchen car! Educational and other public bodies can be notified of the event, and thus a great number of local people find themselves agreeably involved in something that they might otherwise have dismissed as a casual item in the local press. It is, we believe, the first precept of sound salesmanship that the customer should be agreeably impressed . . . and if the popularity of railway exhibitions is any criterion, it is right that they should be regarded as a vital means of attracting a wider field of potential custom.

LEADING FEATURES IN THIS ISSUE

	PAGE
Portrait	
Dr. C. S. Andrews, B.Com., D.Econ.Sc.	9
Special Articles	
Parking	2
Long Welded Rails on Main Lines: North Eastern Region Equipment for Production and Laying: At Dinsdale Depot and on the Track	3
Road Passenger Transport: Some Aspects of Its Operation. By R. MacKenzie	5
Concrete Invert in Gillingham (Dorset) Tunnel (Cont.): A Southern Region Reconstruction	6
New Metsec Bus: Ribbed Panelling Brings Weight Saving	9
B.P. Booklet on Kent Refinery	9
Hertford North Line Reconstruction: Intensive Engineering Work Aided by Bus Operation	11
London Trolleybus Conversion: Stage One Programme	11
River Rescue at Pangbourne	14
Modern Airways Section	
Friendship Aloft: Aer Lingus Demonstration Flight	13
Regular Features	
Book Notices	14
Commercial Aviation	9
Financial Results	16
Forthcoming Events	10
Important Contracts	16
Letters to the Editor	10
Lorry, Bus and Coach News	4
News from All Quarters	8
Road Vehicle Industry	7
Shipping and Shipbuilding	16
Social and Personal	15
Tenders Invited	16

Centenary at Saltash

JOINT plans by the Western Region of British Railways, the Plymouth City and Saltash Borough Councils have been completed for marking the centenary of the Royal Albert Bridge, the railway link, over the River Tamar, between Devon and Cornwall. The proceedings, on Friday, May 1, 1959, will begin with a service of thanksgiving at the Parish Church of St. Nicholas and Faith, Saltash, where, it is believed, Isambard Kingdom Brunel, who was responsible for the design and construction of the bridge, worshipped at the time of its erection. After the service, the Mayor of Saltash, Alderman W. T. Stanlake, will unveil a plaque in memory of Brunel on Saltash Station; there will be a civic luncheon at Saltash Guildhall. To this the council will invite the mayors and town clerks of all Cornish boroughs and the chairman and clerks of all urban and rural councils throughout Cornwall, to do honour to the memory of the man who did so much to open up Cornwall to the rest of England. In the afternoon, a Royal Albert Bridge Centenary exhibition, in the Plymouth City Art Gallery, will be opened by Sir John Carew Pole, Bart., chairman of the Cornwall County Council and a member of the Western Area Board of the British Transport Commission. The exhibition, which will be arranged by Mr. A. A. Cumming, curator of the Plymouth City Museum and Art Gallery, with the co-operation of the Western Region and the support of the Saltash Borough Council, will display models, plans, diagrams and other historical material, with models of the Plymouth North Road reconstruction. Finally, the Lord Mayor of Plymouth, Alderman G. J. Wingett, will give a dinner to civic, railway and H.M. Services guests, when Brunel's memory will again be honoured. Floodlighting of the Royal Albert Bridge is being considered.

Parcels Scheme at Euston

DISAPPEARANCE of parcels and mails trucks carrying outward consignments at Euston Station is foreshadowed by some further structural improvements, work on which has already begun. By the end of this year passengers will be able to approach the booking offices and departure platforms without being held up and impeded by long trains of tractor-hauled barrows. The congestion and inconvenience they cause will be avoided. Post Office mail which now clutters up the concourse is to be brought direct into the present railway parcels office on No. 11 platform and loaded direct into vans waiting there. A new building above the station is to be built for the sorting and dispatch of railway parcels, which will be sent down by lifts to the respective platforms for loading. Road vehicles carrying parcels, G.P.O. letter mail and newspapers will enter the station by the existing entrance in Cardington Street and empty vans, etc., will leave the station by a new exit in Ampthill Square leading to Hampstead Road. Vans carrying G.P.O. parcel post will be received at a new sorting depot to be constructed at Ampthill Square. After sorting at this depot the mail bags will be placed on an overhead conveyor, spanning the main departure lines; this will discharge them on the appropriate platforms. The estimated cost is over £500,000.

Congestion on the Underground

DEALING in *The Times* with recent correspondence in the Press about the inconveniences of Underground travel Sir John Elliot, chairman of London Transport, stresses the need for more staggering—"half a million passengers are travelling in the deep tubes in London in the busiest periods." Enormous cost prevents the widening of lines, but there is one plan which in the Executive's view can (and will eventually) be put into operation, and that is the construction of the Victoria Line tube, north-east to south-west through the heart of the West End, via Euston and Kings Cross, for which Parliamentary powers exist. He points out that London, almost alone of the world's great capitals, has had no new underground line in the centre since 1907. Costing some £55 million (including rolling stock) and able to carry at least 40,000 passengers an hour, it is the considered view that the project should be carried out as soon as possible. Another remedy he suggests is "clearing congested streets of parked cars and vans, so that they can once more become the avenues of movement"; if this were done it would ease the burden all round. It is surprising that most of the letters published overlook the intricacies of tube operation—an expert business subject always to a diversity of emergencies. These require immediate action by central control, and upon the manner in which they are met depend the safety and convenience of the passengers as well as the efficiency and economy of the working: the smooth running of the system is in the interest of passengers generally.

Poster Appeal

THERE seem to be some possibilities in London Transport using its posters to bring the facts to public notice and to explain that refusal by passengers to co-operate produces delays from which all using the system suffer, prevents economic use of transport resources, enhances operating costs and, if persisted in, must lead to still higher fares; nevertheless the class of passenger involved in these incidents is somewhat obtuse to poster appeals and especially to appeals containing lengthy text. One is already used on stations explaining how the passengers themselves lose seconds at every tube stop in the peaks by trying to squeeze into cars that are already full. Another is part of the current campaign to encourage the use of Underground and bus services in the off-peak periods, a campaign which has been subject to some public sniping. It points out that during the rush hours every London bus and Underground train is full at some point in its journey, in one direction at least, but that at other times, notably at weekends, London could be well served with a smaller fleet of buses and trains. Above and below ground there are many empty seats. The average load on a central bus is 20, leaving 36 empty seats; on the Underground car it is 17. The crowded hours produce an economic as well as an operating problem. "How, then," it asks, "can London Transport pay for the essential but embarrassing amount of equipment needed to run the rush-hour services? Or, more simply, how can it fill these empty seats?" That, in fact, is the justification for "Hop on a Bus," cheap evening tickets or special excursions. The off-peak use safeguards the provision of the rush-hour services which London cannot do without.

New Zealand Railways

SATISFACTORY traffics are reported on recent additions to the 3 ft. 6 in. gauge New Zealand Government Railways. Three new North Island branches are reported among the busiest as a result of the development of the timber industry in afforestation areas; they represent almost 12½ per cent of originating tonnage in that island. On the Tokoroa branch, 18 miles from Putaruru to Kinleith, nearly 70 per cent more traffic is now carried than in the first full year of operation after its completion in October, 1952. Last year Tokoroa and Kinleith stations forwarded 200,400 tons of freight and received 128,300 tons; 15,750 head of cattle and 58,860 sheep were dispatched. A 36-mile branch from Murupara to Kawerau was opened on April 4, 1955, but was at first under Ministry of Works auspices, until 1957, when it was taken over by the N.Z.G.R. on July 1 with a nine-mile branch from Kawerau to the East Coast main line north of Edgecombe. But in the year ended March, 1958, the outward tonnage from Kawerau and Murupara was over 577,000; inwards tonnage was 86,700. Local log traffic was also carried extensively between Murupara and Kawerau. On the entire N.Z. railway system the ton-mileage was a record, 1,150,543,000. More than half the locomotive-miles were covered by electric or diesel power for the first time. Nevertheless, results caused some concern, revenue from operations totalling £34,442,769, while expenditure was £35,188,196. The shortfall appears to be mainly in the South Island operations.

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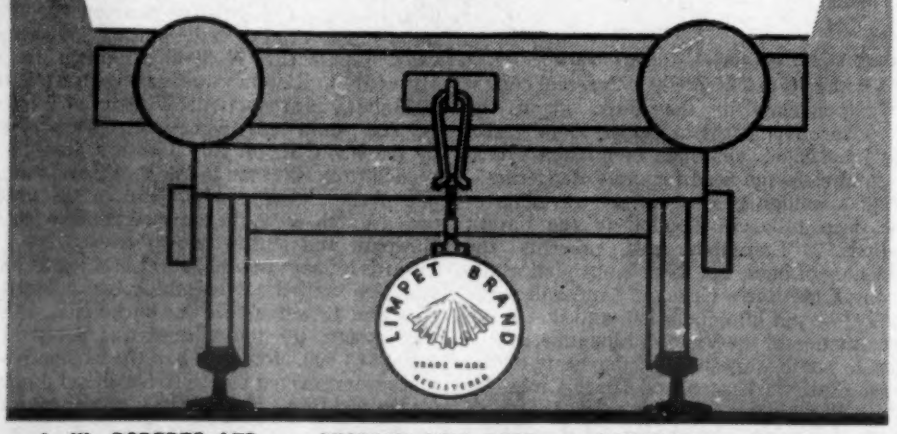

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The Editor is prepared to consider contributions offered for publication in MODERN TRANSPORT, but intending contributors should first study the length and style of articles appearing in the paper and satisfy themselves that the topic with which they propose to deal is relevant to editorial requirements. In controversial subjects relating to all aspects of transport and traffic this newspaper offers a platform for independent comment and debate, its object being to encourage the provision of all forms of transport in the best interests of the community.

★

Parking

WRITTEN by Geoffrey Baker and Bruno Funaro, a new Reinhold book* deals comprehensively with the car-parking problem in America today. If it is accepted, as some maintain, that in the United States all the problems of street congestion and consequent depression of public road transport services due to the rise of motor-car users have already been met some five to 10 years before they became serious in this country, then the close study of this book by our own engineers and planners might well prevent waste of time, energy and large sums of money on supposed solutions that in similar conditions elsewhere have proved no solution at all. There is a growing sympathy here with the American contention quoted by the authors that the cause of present traffic difficulties is too much traffic rather than too little parking space. Any increasingly dense building complex must attempt to accommodate an expanding volume of the road traffic, for cars are more numerous, larger, more used, more comfortable and convenient and are rapidly becoming more necessary. On the open road most motorists keep moving but in towns the majority want to stop and leave their cars near the centre for about eight hours each day. Only by the most expensive sort of surgery can the town or city accommodate any large percentage of such demand, and probably only at the cost of disintegration and abandonment of whatever advantages may still remain in the close-packed urban community. The express highways now appearing in and around many American cities "splitting apart so many old-established communities" are described as "desire lines" directed by the single purpose of motor traffic speed, built without thought to possible social, economic and aesthetic side effects nor, indeed, to the problem of where to park all the cars that the new highways bring to the city centre. Even with the vast American highway programme, new construction, which speeded the traffic between metropolitan areas, only encouraged more road traffic and increased traffic congestion in city centres, emphasising the disparity in size between the approach roads on the one hand and parking facilities and city streets on the other, "as though some drunken planner had zoned the roads in reverse." Here surely is a warning.

Where?

FOR the motorist there is only one really efficient parking space—right outside the door and with covered access; many new types of American development—drive-in office buildings, banks, motels, cinemas and suburban shopping centres—are described and illustrated in the book. But because each car requires such a large area for parking and manoeuvring, any drive-in facility tends to be clumsy and wasteful and small land areas cannot be economically developed for drive-in use. Kerb parking has been traditional in the city since men rode on horseback, but for a car in a congested city centre, kerb parking is outdated and reasons for its continued use are mainly opportunistic. If there is space enough for kerb parking, then the street is uneconomically wide and if there is not sufficient width for both kerb parking and traffic, then widening the street is the most expensive and inefficient way to provide parking space. There might be a few places on the outer fringes of a congested business area where the streets are not yet carrying a full traffic load and one traffic lane could be sacrificed to parking in return for meter revenue, but all kerb parking is inefficient and an outstanding cause of accidents due to pedestrians emerging from between the vehicles and of traffic delay while vehicles manoeuvre into and out of the traffic stream. Ruling out kerb parking, there remain three ways in which parking space can be incorporated in town planning. Each building might be forced to provide on-site space to meet the needs of the traffic it generates; a dispersal of the city centre to give much lower population density, with property owners still required to provide their own parking—which could now be at ground level; and a concentration of community-owned parking space in a ring surrounding the city centre, which would be banned to vehicles and condensed to pedestrian scale, or a similar scheme on a larger scale with public transport alone serving the central area.

How Much?

IN America today there are certain recognised survey techniques used to measure parking demand; when skilfully and assiduously applied these can produce a great deal of useful information, particularly about present habits and discontents. But it is admitted that one survey can do little towards predicting future trends and even a historical series in this field would be open to question as a guide to future growth. Zoning regulations in many American towns now specify exactly how much parking area must be provided per square foot or per unit area of new building, according to use and district. That these parking requirements differ widely from one community to another of similar type is a reflection of two conditions: that the parking specification is a novel problem for which planners have insufficient data and that past predictions of parking need have been so inaccurate. A third factor involved is the difference between the theoretically desirable and the politically feasible. Because it might be many years before regulation can be applied to existing city centres, municipal action seems called for, but both city and individual building owners must henceforth regard parking space not as an extra but as a necessity in the same category as fire precautions and street cleaning. Regulation should also require and define off-street loading space for commercial vehicles.

What Sort?

LAND cost and parking demand will usually be the most important considerations in development. The cost of multi-level parking structures is seldom justified except in busy central areas; in these in certain cases, even the more difficult construction of underground garages might be justified, particularly when they are sited under public parks and squares, where the very high construction costs are offset by the free land. In America such underground garages, where they have been provided under public land at the centres of large cities, have been financially successful. When the cost of providing multi-storey garages is justified, a decision is necessary on the use of ramps or lifts to reach the upper levels. American experience has shown that five levels above or below ground are the maximum economical limit for ramp garages where attendants are provided, but in self-parking ramp garages as many as 10 storeys have been used successfully. Mechanical lift garages are always attendant-operated, whether vehicles are moved on and off the lifts by dollies or under their own power. The modern change which has made mechanical garages competitive in cost and efficiency is the lift mechanism which moves the car vertically and horizontally at the same time, operating in an open shaft running from top to bottom and end to end of the garage and flanked by parking levels each with one and sometimes two lines of parking stalls. Operating costs of mechanical garages are higher than of self-parking ramp garages but lower than ramp garages with attendant parking. All mechanical garages in America have found it difficult to handle peak loads due to the fixed rate at which the lifts can store and deliver cars and this has led to long delays at these times, causing discontent and falling off of business. The authors suggest that these conditions could be improved by more lifts and more vehicle reservoir space at ground level.

Who Pays?

IN areas of low-density development, regulation can compel each landowner to provide parking space sufficient to serve his own property, but such control must be realistic; many existing regulations do not demand sufficient space for anticipated parking loads. Whether such requirement can be made retroactive is doubtful, but it is suggested that it is logical to demand that nonconforming properties should be amortised over a period of perhaps 10 years after regulations have been issued. In practice it is thought that the competitive advantage of adequate parking is so great that retroactive regulation might not be necessary. The property owner without parking space will find himself increasingly penalised as new conforming developments come into competition with his property. To avoid hardship for small property owners, encouragement should be given to combinations of these to finance and maintain common parking facilities. In denser areas it might be better for public authorities to provide parking space as a public service like sewers or water, the cost to be paid by the property owners through taxes and special assessments. In any case, whether parking provision is made a private or public responsibility, it is important to see it as a matter of planning rather than simply as one of finance. Where local authorities provide parking space as a public service, there are many ways to acquire the land and finance the cost. Kerb parking paid for through meters might be a vital device for financing effective off-street parking facilities, but it should seldom be considered as more than an interim measure. Private ownership and operation of parking facilities can profitably be encouraged and can well be integrated with any local programme. But private development of this type can only be encouraged by official control of kerb parking and in return the local authority should insist on some control over garage parking rates.

* *Parking*. By G. Baker and B. Funaro. Published in New York by Reinhold Publishing Corporation. In this country from Chapman and Hall, Limited, 37 Essex Street, London, W.C.2. Price 70s. net.

[Forthcoming Events appear on page 10]

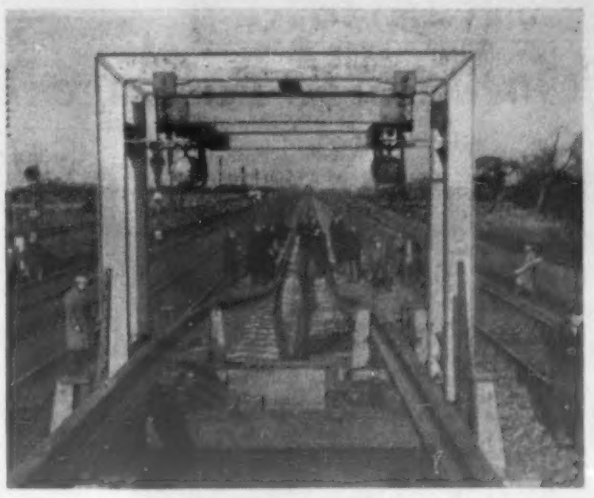
LONG WELDED RAILS ON MAIN LINES

North Eastern Region Equipment for Production and Laying

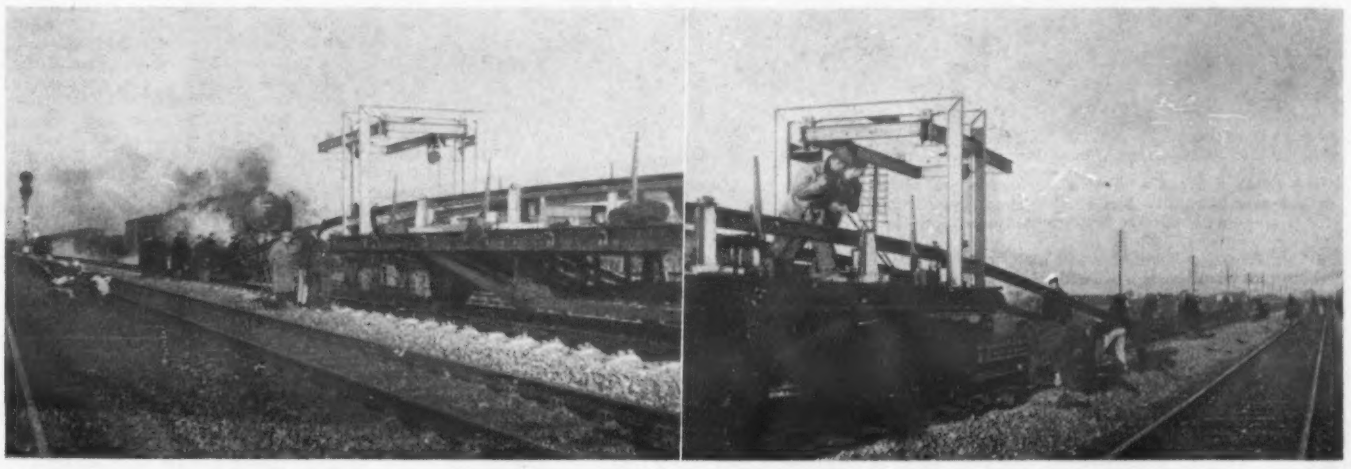
AT DINSDALE DEPOT AND ON THE TRACK

THE modernisation and re-equipment plan of British Railways provides for considerable track improvement. Prominent in this is the introduction of long welded rails which are to be installed on all main lines. The North Eastern Region has recently brought into operation a new depot for their fabrication and has also produced a new method of laying them and we are indebted to Mr. A. Dean, chief civil engineer, for particulars thereof. Long welded rails are already being laid on sections of the East Coast route between York and Darlington. In order to accelerate their installation the North Eastern Region has constructed a new rail welding depot at Dinsdale, near Darlington, where the welding of 60-ft. long rails into continuous lengths of 300 ft. or more will be undertaken.

Welded rails give smoother riding of trains with increased comfort to passengers while elimination of the gaps between rails reduces wear and tear on locomotives, coaches and wagons and considerably reduces permanent way maintenance costs.



The rear wagon of the North Eastern Region train for laying long welded rails showing equipment for guiding rails into position on the sleepers and the gantry for lowering the final rail ends



Laying 300-ft. long welded rails on the East Coast main line near Beningbrough, north of York, showing them being drawn off at 4 ft. 8½ in. gauge ready to spike down in the track

New Depot

The new rail welding depot at Dinsdale has been constructed on a site between the Darlington to Saltburn and Fighting Cocks branches. It is particularly well situated, being on the fringe of industrial Tees-side which supplies most of the steel rails for the North Eastern Region. The depot has been designed primarily to produce long welded rails 300 ft. in length from standard 60-ft. lengths of new and serviceable rail, but provision has been made for extensions to allow production of rails in 600-ft. lengths. Other work to be undertaken is the dismantling of old track and the assembly of new 60-ft. lengths of prefabricated track which will still be required for certain sections of the line. Facilities are provided for accepting, unloading and storing new rails, wood and concrete sleepers, and track fittings.

The depot buildings, mainly constructed of brick and concrete, comprise a shed for the rail saw and drilling machine, a welding shop containing an automatic flash butt welding machine and an electric post-heating machine and other ancillary equipment. There is a combined compressor and transformer house where compressed air is produced for operating machines and tools and where electricity from the grid is transformed to the required voltage to supply power for machines and lighting. There is also a combined staff amenities and office block which includes a mess room, locker room and washing facilities, together with offices for staff controlling the depot. Accommodation is provided in this building for the management unit which controls and co-ordinates the work of this and other depots belonging to the chief civil engineer's department in the Tees-side area.

Equipment

One of the depot's main features is a 10-ton overhead traversing crane which moves along a gantry 607 ft. in length and with a span of 76 ft. 10 in. Rails are moved from machine to machine by powered roller conveyors and little manual labour is involved. The principal machines and tools installed, nearly all of which are completely automatic, are, in order of sequence: a rail saw and drilling machine; a pneumatic angle grinder for cleaning rail ends prior to welding; a flash butt welding machine for welding joints; pneumatic chipping hammers for removing surplus welded metal; a post-heating machine where the joint is reheated to remove any internal stresses; a vertical and horizontal straightening press which ensures that each welded joint is accurately aligned; and a grinding machine which grinds and smooths the rail to the correct profile.

The long welded rail, having been processed, is moved on a powered roller conveyor to a position underneath a series of 10 synchronised power operated hoists. These are each of one ton capacity and are controlled from a central point. These are provided for lifting the long rails on to a stillage for storage or on to railway wagons standing on an adjacent railway track. These hoists can also be operated individually, in pairs, or in fives to handle rails which are less than 300 ft. in length.

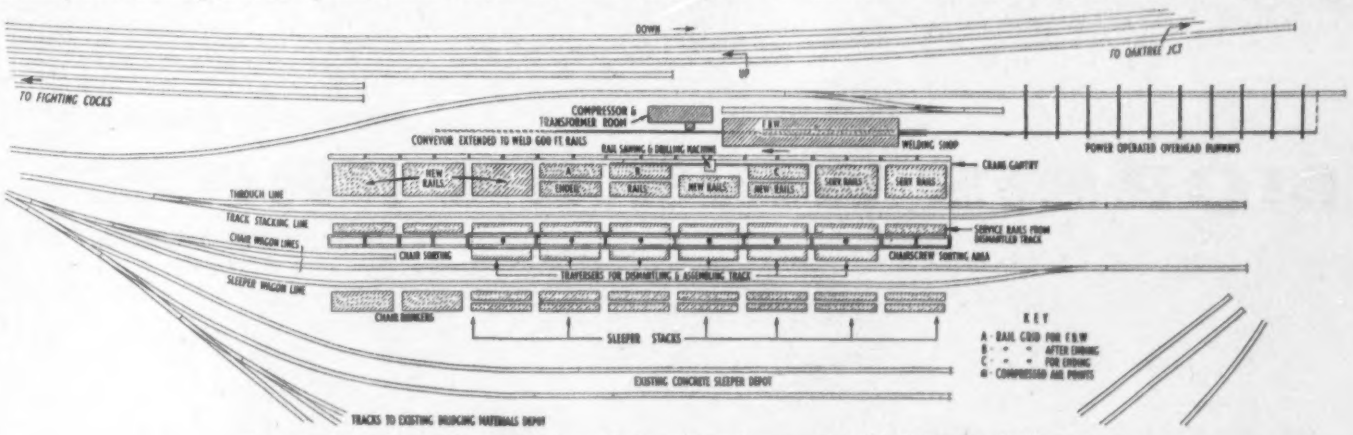
The section of the depot engaged on the assembly of 60-ft. lengths of new prefabricated track and the dismantling of old track, utilises six 60-ft. traversing trollies. These are propelled at right angles to their length along rails situated between the stanchions of the overhead traversing crane gantry; the work of assembly or dismantling is carried out in stages. The overhead crane is also used for lifting and lowering this type of track and rails from or on to the trollies.

The depot is capable of dealing with both 95-lb. bullhead, 98-lb. and 109-lb. flat bottom rails. Annual output will be about 55 single track miles of continuous welded rail and 35 miles of pre-assembled 60-ft. lengths of track. Approximately 20 miles of old standard lengths of track will also be dismantled each year.

Laying Long Welded Rails

The novel method of laying long welded rails in the track to which reference was made has been devised by the chief civil engineer's department of the North Eastern Region. Laying rails of a length of 300 ft. or more presents difficulty and until quite recently the method adopted in this country has been to unload them from the carrying wagons on to the permanent way and then to manhandle them into their soleplates.

Using the new method it is possible to lay in approximately one track mile of long welded rails in one continuous operation with considerable saving in time and manpower, and also to avoid damage to rails. A train of 11 Salmon type bolster wagons with a total length of about 700 ft. is used for the operation. Up to 36 welded rails, 300 ft. in length, can be loaded on to the bolster wagons and pairs of these rails are fishplated together to form 600-ft. lengths (eventually continuous welded rails 600 ft. long will be available). The rear wagon of the train has special gantry equipment which has been designed for guiding the lengths of rail off the wagons at normal rail gauge of 4 ft. 8½ in. and for lowering the rail ends to track level.



Layout of the North Eastern Region rail depot recently opened at Dinsdale near Darlington

Method

Before starting laying in operations the rail ends are anchored to the track by 60-ft. steel wire ropes and the 11 wagons are drawn forward by a 850-h.p. diesel-electric shunting locomotive until the first 70 ft. of each pair of rails is clear, and the ends of each length have been deflected down to the level of the rails in the track. During this part of the operation the first pair of existing short rails is tipped out manually from its sleeper seatings. The train is brought to a stand and the ends of the long rails are put into position in the vacant sleeper seatings. The ends of the long rails are then fishplated to the existing track and the wire ropes removed.

Thereafter the train is kept moving at a constant speed of about 80 ft. a minute (the short rails being tipped out in pairs as the rear wheels of the last wagon move clear) and the 600-ft. rails are guided into their sleeper seatings by men using bars. When the free ends of the first pair of 600-ft. rails have reached a position on the wagon next to the gantry wagon, the train is stopped and the rails are fishplated to the second pair of 600-ft. lengths. This cycle of operations continues until the last pair of rails is being drawn off the wagon.

When only 2 ft. or 3 ft. of long welded rail remains to come through the last pair of rollers the train is stopped and the rail ends lifted just clear of the bottom rollers by chain lifting blocks suspended from a lowering gantry. The train then moves forward a few feet and when it is stationary the rail ends are lowered into position. Portable telephone equipment is used for communication between the engine and the gantry wagon of the train.

The traditional open gapped joint was for many years generally accepted as necessary to allow for the normal expansion of rails following rises in temperature. Steel rails, in common with other materials, will, when unconfined, expand or contract as temperature varies, but such movements can be counteracted by the imposition of a balancing compressive or tensile force on the rail which will maintain it at constant length.

In practice, rails are not entirely free to move because of the frictional forces developed at their chair or baseplate seatings and by their fastenings, the extent to which movement occurs depending on the type of fastening.

PRINCIPAL CONTRACTORS FOR DINSDALE RAIL WELDING DEPOT

Equipment Supplied	Contractor
Loading gantries and crane gantry	Wright Anderson, Limited, Gateshead
Flash butt welding machine and post heater	A.1 Resistance Welders, Inverness
Vertical and Horizontal straightener	Fielding and Platt, Gloucester
1-ton hoist blocks (10)	Paterson Hughes Engineering Co., Limited, London
10-ton overhead gantry crane	Paterson Hughes Engineering Co., Limited, Glasgow
150 cu. ft. air compressors (2)	Broom and Wade, Limited, High Wycombe
Underground cable work	Clough, Smith and Co., Limited, Wolverhampton
Switchgear	English Electric Co., Limited, Liverpool Dorman and Smith, Limited, Manchester
Current collector equipment for post heater and rail straightener	British Insulated Callenders Construction Co., Limited, Liverpool
Water cooling towers	Heenan and Froude, Limited, Worcester
Earth proving equipment	Nalder Bros. and Thompson, Limited, London
Lighting towers	Tubewrights, Limited, Newport (Mon.)

At Dinsdale rail welding and track handling depot: 10-ton overhead crane unloading concrete sleepers for prefabricated track; monorail loading gantries each equipped with 1-ton hoist blocks, and, right, flash butt welding machine in operation in the welding shop

LORRY—BUS—COACH

One-Man 53-Passenger Buses Resented

GRIEVANCES of Lincolnshire Road Car busmen about present and prospective operation of one-man buses were aired at a meeting they had with Mr. Geoffrey de Freitas, Socialist M.P. for Lincoln, on Friday last week. One particular grievance under which they are labouring is that the traffic commissioners have permitted the use, under dispensation, of one-man operated Bristol single-deckers with a seating capacity of 45 and eight standing passengers. Normally, a one-man operated vehicle must not exceed a seating capacity of 20.

The Lincolnshire Road Car Co., Limited, has been operating one-man vehicles for about 18 months, and is now using 35 such vehicles, each with a seating capacity of 35. Mr. H. J. Downs, traffic manager, states that the need to extend one-man operation should be considered rationally, and such developments as the acceptance of standing passengers at peak periods and the use of 45-seaters on one-man operation must be appreciated as a means of meeting a challenging position. The Lincolnshire men are members of the N.U.R. It will be recalled that the company also has a 54-seat (three-and-two) version of the Bristol single-decker.

Lincoln Bus Station

DESTINED shortly to come into service of the Lincolnshire Road Car Co., Limited, is a new bus station at St. Mark's, Lincoln. It is likely to be ready for service by February 16. Pushchairs will be available to mothers travelling with young children.

Northern Ireland Motorists Warned

CAR owners who drive their neighbours to work for payment are imperilling the future of public transport in Northern Ireland, declared Mr. R. Carlisle, assistant traffic manager of the Ulster Transport Authority. He added that the U.T.A. was increasingly concerned about this illegal practice.

More Eire Coach Tours

EIGHT U.K. coach operators have so far been granted authority to run tours in Eire this summer, including two newcomers, Frames Tours, Limited, and Blue Cars Continental Coach Cruises, Limited. The Workers Travel Association and Wallace Arnold Tours, Limited, will hire coaches from C.I.E. Several applications were still outstanding at this stage.

Unpopular with Some Socialists

IN the fight against renationalisation, it was encouraging to note that an independent inquiry recently conducted among active members of the Labour party showed that even among those enthusiastic members the proposals which attracted most opposition were those of nationalisation, claimed Mr. R. N. Ingram, R.H.A. chairman, in Birmingham on Wednesday this week. R.H.A. determination to oppose Socialist policy was now taking shape through the advertising and public relations campaign. An illustrated brochure would very shortly to go to all members which would give a clear picture of what was being done. When they had seen this he would appeal to all members who had not already subscribed to the advertising fund to do so immediately and as generously as their circumstances permitted.

Headway Cuts in Bristol

REDUCED bus service frequencies are planned for Bristol during certain off-peak periods, beginning probably early in February. Mr. W. W. Williams, divisional traffic superintendent, Bristol Omnibus Co., Limited, states that many routes are likely to be affected. The off-peak periods concerned are principally from 7 p.m. on weekdays and Sunday p.m., headways will also be reduced. Five-minute frequencies will become 6 min.; 6 min. headways 7½ min.; 12 min. headways, 15 min.; and 15 min. headways, 20 min. This is in order to meet the recent wage award to bus crews.

A Leyland Titan with 65-seat Burlingham body: this Manchester Corporation bus is leaving the new Piccadilly Bus Station on a limited-stop service; right, one-man Albion Aberdonian with 40-seat Seddon bodywork on the local Didsbury—Parrs Wood route

Brighton Carrier Expands

A BASE at Chichester has been secured by Nicholls and Co. (Brighton), Limited, the Brighton and London carrier and contract-hire specialist. The South Eastern area Licensing Authority has granted an A-licence under section 11(3)(b) in respect of 13 vehicles, the licence being previously held by Wincanton Transport and Engineering Co., Limited, and for two B-licensed vehicles conditioned "milk and other goods." Nicholls already has vehicles licensed from bases in London, Cambridge and Rainham, Kent.

Milk Transport Companies in Merger

NEWS of a proposed merger between United Dairies, Limited, London, and Cow and Gate, Limited, Guildford, will presumably bring into association the transport undertakings of both, Mickleover Transport, Limited, of United Dairies, and Wincanton Transport and Engineering Co., Limited, the Cow and Gate subsidiary. Wincanton Transport, formed in 1925, operates some 750 vehicles on collection and bulk delivery of milk in several areas of England.

A Successful Transport Strike

FROM last Friday, the five-day stoppage of road transport in Italy, called by the National Association of Road Transport as a protest against the new highway code became increasingly effective, it is claimed. The new code is due to come into force at the end of this month. It was reckoned that between 80 and 90 per cent of all the 386,270 vehicles concerned took part in the strike.

Great West Road Bus Plaint

UNSUCCESSFUL in its approach to London Transport, Heston and Isleworth Borough Council is to take further its case for restoration of bus route 91 on Sundays. This route, which ran between Hounslow West and Hammersmith on that day, was one of the most drastic withdrawals in the November, 1958, economy programme. It left over 4½ miles of Great West Road uncovered by buses on Sunday and a further 1½ miles of road in Chiswick also.

Car Relief for Drivers—Summonsed

RELIEF drivers sent out in cars to take over lorries and thus enable the original drivers to return home in their own cars were referred to in Spilsby (Lincs) magistrates court on January 19. Ernest William Broomfield, a driver, was summoned for failing to have at least 10 consecutive hours for rest in 24, calculated from the time of beginning work on July 10 and 11. His employer, Cyril Edward Shaw, trading as Shaw Brothers, produce merchants, of Friskney, near Wainfleet, was summoned for permitting the offences. It was said that after Broomfield had completed his permitted hours of driving at Lincoln on July 10 and at Wetherby on July 11 he handed his lorry to a relief driver and returned home in his own car. This arrangement involved journeys of 45 and 120 miles. The prosecution said that in these circumstances Broomfield did not have at least 10 consecutive hours for rest. It was claimed that the journey home in his own car was only a continuation of his driving. Shaw Brothers said the procedure had been adopted at the suggestion of drivers. Mr. G. G. A. Whitehead, defending, said that once the driver had left the lorry he was no longer under the directions of his employer. There was nothing in law which directed how his spare time should be spent, and he contended there was nothing illegal in the system. The magistrates dismissed the two summonses against Broomfield. An adjournment sine die of the summons against Shaw and of a similar summons against another driver, and a summons against Shaw for permitting this second alleged offence was granted so that fresh instructions could be secured by the prosecution.

Hinckley Point Bus Services

ON Monday last week, the Western area traffic Commissioners considered applications from the Western National Omnibus Co., Limited, and the Enterprise Bus Co., Limited, Bridgwater, to vary conditions of licences to allow both to operate on Sundays between Bridgwater and Hinckley Point nuclear power station site. Mr. T. D. Corpe appeared for Western National and Mr. K. B. Haybittel for Enterprise, his own company. The latter contended that by the operation of a pooling system it was carrying most of the passengers and thought that it should be allowed to have all the traffic. Mr. Corpe said that on January 3, 1958, licences were granted both companies to operate the services, the Commissioners deciding that the business should be shared. A pooling arrangement had been made. According to the evidence of Mr. Haybittel there was not enough traffic to justify two operators. They had had a thin time in 1958.

Western National income was 24d. per mile on a two-fifths basis and that of Enterprise 27d. on a three-fifths basis of pooling. The pool arose after the original licences were granted last January. Pool and non-pool services were being operated. The non-pool services of both companies were losing money. Mr. S. W. Nelson, the chairman, said that, with the existence of the pool, he did not see the need for independent services as well. The pool had not done what it was understood would be done, which was to balance mileage and cut out much empty running. The undertaking of January, 1958, had not been quite met. This was that there should be economy of operating. Granting both applications, he urged a meeting with the contractors to ascertain the real need. Workmen could not choose their own companies. He did not acknowledge that but he did want to avoid empty running. He would not publish the decision nor make conditions which prevented varying the timetables to suit local needs. The application was for both companies to operate each Sunday instead of on alternate Sundays.

Bus and Coach Developments

Babbage and Son (Cromer), Limited, applies for the licences of Central Garage (Sheringham), Limited.

Glyn Davies, Ebbw Vale, applies for a local service between the Palace and Beaufort (Garn-Lydan Estate).

Premier Travel, Limited, proposes an express service on summer Saturdays between Bedford and Cromer via Huntingdon and Fakenham.

Commencing January 21, London Transport bus route 165, Havering Park—Rainham, was diverted at South Hornchurch via the Mungo Park estate.

Newport Corporation proposes a new High Street—St. Julian's Estate (Merlin Crescent) service. It would replace the existing High Street—Gainsboro Drive route.

Harper Bros. (Heath Hayes), Limited, proposes a Cannock—Birmingham service via Heath Hayes, Brownhills, Aldridge, Streetly Works and Kingstanding. No local traffic would be carried between Kingstanding and Birmingham.

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ROAD PASSENGER TRANSPORT

Some Aspects of Its Operation

By R. MacKENZIE, B.Sc., M.Inst.T., General Manager, Scottish Omnibuses, Limited*

THE double-deck bus continues to hold its prominent position as the backbone of British road passenger transport operation, both in the company and municipal fields. Its popularity arises not merely from tradition, but because of its economic advantages, and its ability to deal with peak-hour traffic. While the single-deck vehicle has become stabilised in its general design, the double-deck bus has entered upon a phase of development, the final outcome of which is not yet clear.

Economic difficulties have driven the operator to increase the size of the vehicle and the number of seats provided. That is already the accepted practice with the typical single-decker, which now provides 41-45 seats within the maximum permitted dimensions, normally combined with a front entrance and driver-operated door. That arrangement has produced a new and desirable degree of co-operation between driver and passenger which has beneficially affected the conductor in dealing with peak-hour loadings.

With the relaxation in double-deck length restrictions, seating capacities have increased to the 70 mark and beyond, and have taxed to the limit the ability of the conductor to collect the fares and attend to his passengers. Automatically the operator has looked to the front door design as the means not only to solve the immediate problem but

TABLE 1.—PASSENGER JOURNEYS ON STAGE CARRIAGE ROAD SERVICES IN BRITAIN

Year	*Total journeys (millions)*	*Variation per cent year to year*
1949	16,582	
1950	16,416	−1.00
1951	16,311	−0.64
1952	16,008	−1.86
1953	15,737	−1.69
1954	15,646	−0.58
1955	15,555	−0.58
1956	15,057	−3.20
1957	14,410	−4.30

Since 1950, the total reduction is 13.85 per cent.

to enable him to increase still further the passenger-carrying ability of the vehicle. Designs are now available giving seating accommodation for virtually 80 passengers within an overall length of 30 ft.

Unorthodox Designs

New double-deck designs on unorthodox lines have now emerged, and operating experience is awaited with keen interest. The American practice of rear-engined design has yet to be proved and accepted in this country where operators are necessarily more cost-conscious, both in initial outlay and in the cost of operation and repair. What effect on engine life, and on vehicle accident repair costs, will its rear position produce? And if its position at the rear necessarily involves a system of automatic or semi-automatic transmission, what will be the effect on fuel consumption?

At best the scope for economical employment of maximum capacity double-deck buses must be quite restricted. In most cases, full-time use of such vehicles implies a reduction in basic frequency which undoubtedly could have a disastrous effect on traffic, except perhaps where the headway was extremely close. Despite the economy which flows from the employment of less vehicles and crews, we must ensure that in the process we do not chase away the traffic which we are all anxious to retain, and encourage. Is the role of the maximum capacity double deck to be for peak-hour operation where undoubtedly duplication costs can be reduced? If so, it indicates a reversal of the long-established practice of employing the newer vehicles on longest duties, and it accentuates the problem of spreading a high capital cost over a low annual mileage. The position would be aggravated if such vehicles were operationally more expensive. The 27-ft. long—and in some cases the 30-ft. long—rear-entrance double-decker is by no means dead, and undoubtedly will retain a wide popularity.

Integral Construction

The current single-deck design has become well established, and is of proved popularity with both the passenger and the crew. Nevertheless, improvements may still be looked for, particularly in the width and height of access, to overcome the boarding and dismounting difficulties experienced particularly by older persons and by children. With one or two important exceptions, integral construction in passenger vehicle design tends to become extinct after a very short life. Integral design, however, does produce a reduction in capital cost and in weight, with resulting reduction in fuel consumption, and operators in the constant search for economy should be prepared to adjust their outlook and their repair practice where, as in this case, more economical operation will result.

More manufacturers include automatic and semi-automatic systems in their standard specifications in addition to the more orthodox and long-established straight transmission incorporating clutch and gearbox. It is a trend towards more complication, more skilled and expensive maintenance, and poorer fuel consumption, some at least of which may be offset by higher operating speed, simplification of driving and reduction of crew fatigue. Development in this field is by no means static, and the final form of transmission is not yet apparent. Can we anticipate the development of a fully hydraulic system of transmission employing an engine governed to maximum torque speed coupled to a variable hydraulic pump, the drive being effected through hydraulic motors attached to the individual rear wheels. Such a system might be employed additionally for braking purposes, and while a poorer basic fuel consumption could be anticipated, the elimination of clutch, gearbox, and differential assemblies, with their inherent friction losses, would be an offsetting factor.

Despite its recent introduction in this country, air suspension has been widely welcomed, and is offered on an increasing number of chassis. At present, air suspension presupposes the provision of air brakes on the chassis. There are, however, many adherents to the vacuum braking system which, over a long and wide experience, have shown to advantage in passenger comfort, low initial and maintenance cost, and simplicity in servicing, and it is hoped that a design of air compressor can be found suitable physically and economically for fitment to vacuum-braked chassis and capable of dealing solely with the suspension system. There could be advantage in any event in separating the system of braking from the system of suspension. Experience is being built up with disc braking, and the results are awaited with interest.

Increasing Passenger Comfort

Reference has already been made to the trend towards large-capacity bodies fitted with front door. Not so long ago, the body was cheaper than the chassis, but the position is now reversed. Within 20 years, chassis prices have advanced by some 150 per cent, and body prices by at least 250 per cent. Why is that so? Is it a matter of production methods? Chassis variations would tend to be less than was formerly the case. Surely the difference is not accounted for by the individuality of the operator who seeks to incorporate his own ideas in the body to a greater extent than in the chassis, for has that tendency, if it exists, not always existed? In any event, it is probably confined only to the equipment of the body rather than to the body structure itself. It is an intriguing point to which there must be an answer, and a solution, too.

Body design tends towards passenger appeal and the embodiment of materials which are not only attractive but remain so with a minimum of cleaning. Comfort standards are rising, not only in the design and upholstery of the seating, but in the lighting, heating and ventilation of the saloon. More can be done in insulation against sound both from the chassis itself and from outside sources. Additionally, noise should be controlled at its source, and air suspension is probably an advantage in that respect. We must approach nearer to the standard of car comfort to enable us more effectively to compete with that form of transport. The problems are partly technical and partly economic, and both must be capable of solution. In today's conditions the excessively austere vehicle, despite a slightly lower initial cost, is unlikely to succeed, and will undoubtedly prejudice the passenger in favour of other competitive forms of transport.

Fares and Costs

Experience has shown that road passenger transport does not follow the normal commercial practice of increasing sales by cutting the price. Those who have reverted experimentally to lower fares have not found that cheap fares have been a commercial success—on the contrary, they have found that less and not more revenue has been obtained, and in that direction the solution to our industry's problems will not be found. Nevertheless, it is clear that continuous fare increases do cause a reduction in the number of travellers which taken cumulatively must necessarily result in a diminution in the standard of the facilities provided.

Against the apparently continuous increases in labour and material costs, there remains little scope for greater economy in operation. With the substantial improvement in engine and unit life, there has been some movement towards extension of docking periods, and it seems likely that some further economy both in materials and in labour, lies in that direction. Night rates now make it essential that only the absolute minimum of work is carried on night shift. The convenience of carrying out cleaning and oiling operations at night when the vehicles are readily available can no longer be afforded, and it is now essential to transfer them mainly to day shift, despite the difficulty of avoiding any deterioration in the standard of cleanliness which undoubtedly would be resented by the travelling public.

Further extension of mechanical external cleaning will be justified, and there will be renewed interest in the cyclone type of interior cleaner already widely used in America. One may anticipate some savings from simplification of office procedures, including the mechanisation of paying-in arrangements. An extension of one-man operation appears to be inevitable despite the lower standard of personal service to the passenger which is inherent in that arrangement. In the densely populated areas, larger vehicles will be brought into use, and possibly some of the standee type too.

TABLE 2.—PRIVATE PASSENGER MOTOR VEHICLES REGISTERED IN BRITAIN

Year	*Motor cars (thousands)*	*Increase over 1948 per cent*	*Motor cycles including motor scooters and mopeds (thousands)*	*Increase over 1948 per cent*	*Total (thousands)*	*Increase over 1948 per cent*
1948	1,961	—	559	—	2,520	—
1955	3,528	80	1,256	125	4,782	90
1956	3,888	98	1,326	137	5,214	107
1957	4,187	114	1,471	163	5,658	125

Trade Unions Not Helpful

These developments are being tried out with the object of reducing costs of operation, of minimising increases in fares, of halting the downward trend in passenger numbers, and of retaining in employment the maximum number of drivers, conductors, and other personnel. It is regrettable then that the trade union should appear to regard these developments solely from the doctrinaire point of view and should seek to impose sanctions on their operation with the object of extracting greater personal rewards. Such actions are contrary to the oft-repeated promises of co-operation given by trade union leaders at times of wage awards, and cannot fail to produce a reduced level of employment within the industry.

Figures issued recently by the Ministry of Transport confirm that the downward trend in the number of passengers carried has continued and show that the decline has accelerated, as given in Table 1.

When considered in relation to the increase in cars registered in Great Britain, as shown in Table 2, the decline, however disturbing, is not surprising.

Passenger decline has been accentuated too by the development of television. It seems likely that the number of homes without television will shortly be in the minority. The advent of colour television will doubtless increase the

(*Continued on page* 12)

* Abstract of a paper to the Northern Ireland section of the Institute of Transport on January 15.

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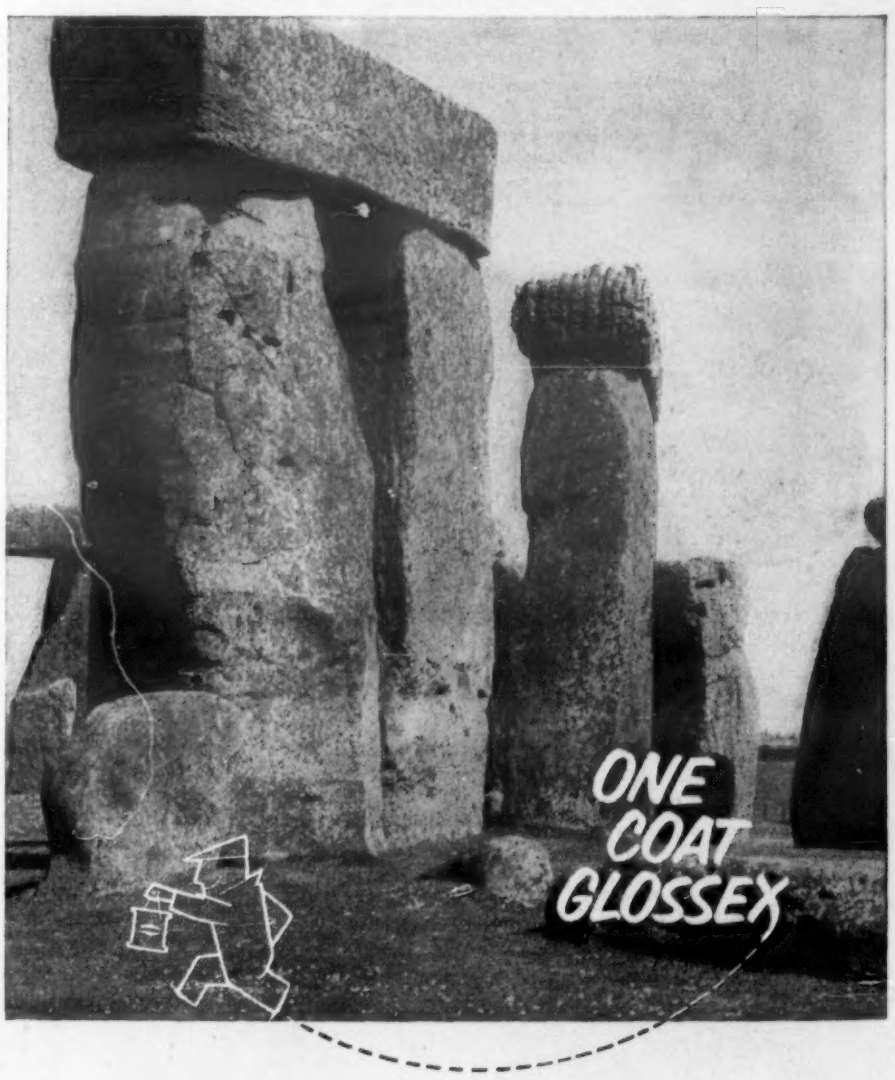

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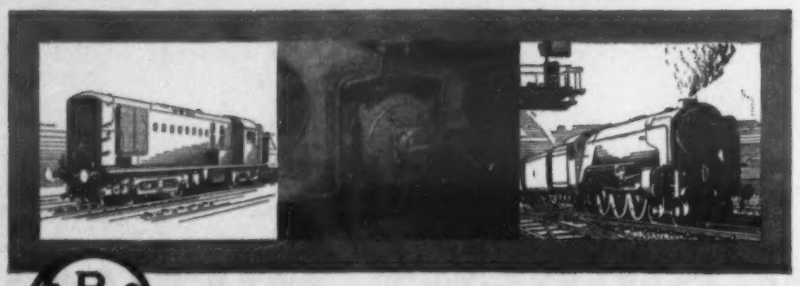

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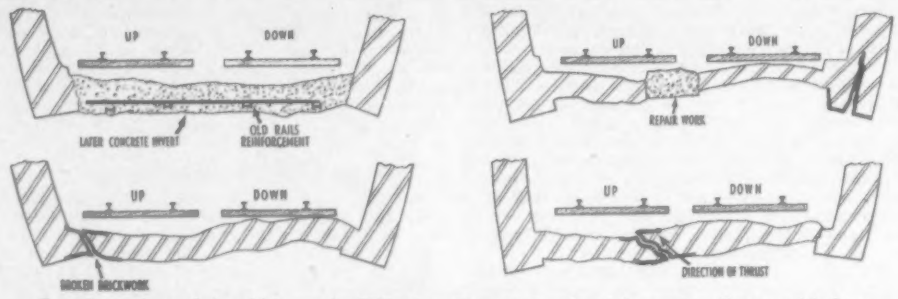
A CONCRETE INVERT

*In Gillingham (Dorset) Tunnel (Cont.)**

A SOUTHERN REGION RECONSTRUCTION

WORK in Gillingham Tunnel on the main line of the former London and South Western Railway from London to Exeter is being undertaken with a view to overcoming bad permanent way conditions in the tunnel and deformation of the lining due to pressures set up in the water bearing strata through which it passes. The previous portion of this article described the introduction of a new concrete invert to stabilise the position.

A supply of compressed air is needed to operate the pneumatic clay spades, picks and concrete breakers and for this purpose three diesel rotary compressors, coupled to an air reservoir tank, have been installed on a stage immediately outside the mouth of the tunnel with a 3-in. steel pipe air main laid throughout the length of the tunnel suitably tapped at frequent intervals for hose connections. To deal with the volume of water which flows through the 6-ft. drain, a 2½-in. electrically driven Univac self-priming pump is mounted on a trolley which is positioned on the occupied track on the London side of the working area. This pump works continuously night and day by-passing the water over the working area through a 3-in. steel discharge main. While this pump deals with the majority of the water, two 1½-in. electrically driven lift and force diaphragm pumps are provided, one at each of the excavations being worked on in order to dispose of the local water coming through and under the tunnel walls. These 1½-in. pumps are connected by flexible hoses to the nearest end of the working area. A diesel-driven 4-in. pump, mounted on a further trolley, is kept in reserve for employment should the Univac pump break down.



Sample sections of the old invert in Gillingham Tunnel showing deformation discovered before replacement was undertaken

Safety

A safety barrier is erected along the 6-ft. way over the length of the working area to prevent the men from going on to the track which is open to traffic. At the completion of each 2-chain length of invert, a system of ballast retaining timbers is fixed along the 6-ft. way and the track adjusted to correct line and level. New stone ballast is then conveyed into the tunnel by hopper wagons and discharged directly over the new invert, the ballast being consolidated by pneumatic vibrators. Good lighting is provided from a three-phase current supply which also serves the electric motors.

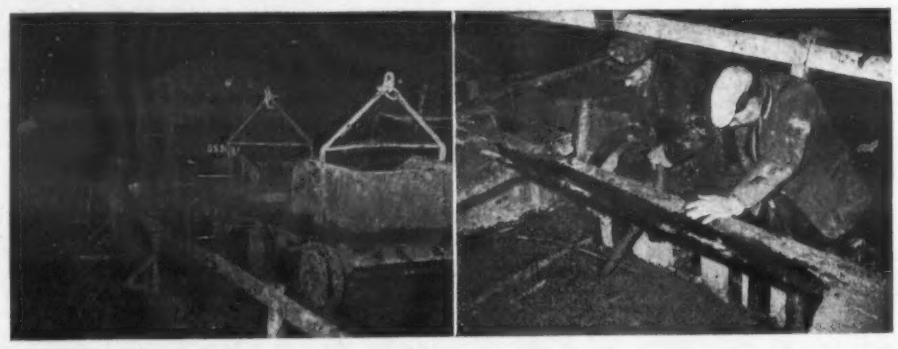
* First portion appeared January 17.

The trolleys containing the loaded spoil skips are taken to the dumping ground situated on each side of the line within the limits of the temporary crossovers, where the skips are lifted off by means of a KL44 mobile crane and discharged into a dumper. The dumper then proceeds along the tipping site where the spoil is tipped as required. For mixing the concrete, two diesel-engined 10/7 mixers are installed in the cess at the side of the track; these machines are mounted on runners so as to discharge the concrete direct into the trolleys on the occupied line.

Supplies

The specially graded all-in aggregate is offloaded on to stages in quantities of 200 tons at a time on each side of the concrete mixers, and as the aggregate is used up the concrete mixers are moved along to avoid unnecessary handling of the aggregate. A cement store is erected on each side of the line just clear of the aggregate piles, each shed being able to accommodate 40 tons of cement. These quantities supply the job for a fortnight. Arrangements are made to move the concrete mixers, crane and other plant over from one side of the line to the other as may be necessary to suit the single-line working. Water is derived from a spring situated above the tunnel, and this is conducted by pipes to a storage tank near to the concrete mixers.

A 1,000-gal. diesel oil storage tank is situated above the tunnel alongside the public roadway to enable the tank to be filled by road oil tankers and avoid the necessity of handling small oil drums. The oil from the main storage tank is conducted to the compressors at track level by pipe line. Temporary platforms have been provided for the use of the workmen employed on the tunnel and arrangements have been made for special train stops at the start and finish of each shift. The staff comprises 24 in each shift, there being 17 at work in the tunnel, five permanent way men, including the motor trolley driver, and two fitters. All materials, except the diesel oil, are conveyed to the site by material trains. Offices, stores and mess accommodation have been provided at the Exeter end of the tunnel, together with a workshop for plant maintenance. We are indebted to Mr. A. H. Cantrell, chief civil engineer, Southern Region, and his staff for the opportunity afforded of visiting the site.



Work in Gillingham Tunnel: Material train hauled by Wickham diesel trolley; right, vibrating new concrete into place

Work has been proceeding steadily since last April on the construction of new access roads to the northern entrance of Blackwall Tunnel including the underpass to East India Dock Road which appears in the accompanying illustration. Since it was taken the tunnel portal has been demolished. The second stage of the scheme involves construction of a second bore somewhat to the east of the present tunnel

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ROAD VEHICLE INDUSTRY

Plastics-Coated Steel for Bodybuilding

WHAT is claimed to be the first vehicle ever to have an interior lining of plastics-coated steel has been produced by Rootes, Limited, Maidstone. The vehicle, a Karrier ambulance, is fitted with a composite wood-light alloy body, the roof, sides and rear doors being lined with white Stelvetite. The material was selected after tests proved it to be completely hygienic, easy to clean and simple to manipulate with conventional bodybuilding tools. In addition, the material is attractive in appearance. The ambulance is designed to carry in the rear four sitting patients together with an attendant and two sitting patients alongside the driver. Alternatively the rear can be adapted, by converting the bench seat into a stretcher mounting, to accommodate two stretcher cases. The vehicle is to be operated as a works ambulance by the Rootes Group manufacturing division at Coventry.

Acid-Neutralising Sump Plug

NOW being manufactured in this country by Magnaloy Products, Limited, Chertsey, Surrey, which has also been granted the marketing rights in the Sterling Area and Commonwealth countries, is the Magna-Power acid-neutralising sump plug. The unit replaces the normal sump drain plug and incorporates an insert of special magnesium-aluminium alloy which, according to the findings after long investigation by the National Research Council of Canada, has the effect of neutralising engine acids as they are formed. The alloy was developed by an American scientist, who holds world patents. The plug also includes a magnetised tip to extract ferrous particles from the oil. Remarkable claims for freedom from sludging, extension of oil-change periods and reduction of engine wear are made as a result of extended tests with the plug fitted to cars and commercial vehicles in both North and South America.

Apaseal

TO simplify the administration of the two rapidly expanding businesses of A.P.A. (Automotive Parts and Accessories) and Bowes Seal-Fast Corporation (Great Britain), Limited, both of Bowes House, Hailsham, Sussex, it was decided as from January 1, 1959, to run them together as a single concern under the name of Apaseal, Limited, of the same address—the holding company of the shares of both companies. It is emphasised that this is a change of internal organisation only and will not affect or alter the general policy and conduct previously carried out by the two separate businesses concerned, which policy Apaseal, Limited, will continue as hitherto, with the intention of still further improving the service.

Kenex Literature

NEW publications issued by Kenex Coachwork, Limited, Castle Street, Dover, Kent, describe and illustrate the various Kenex conversions of Austin, Bedford, Ford and Morris vehicles. Latest price lists are also included.

H.F. Convertible Salvage Crane

DESIGNED for lorry mounting, a new salvage crane added to the range of equipment produced by Harvey Frost and Co., Limited, Bishops Stortford, has a number of interesting features. The principle feature is a luffing jib with long overhang, which permits a 3-ton lift from a mid-point hook at 4-ft. reach and a 30-cwt. lift from a jib-end hook at 81 ft. reach through a single hoist. Assuming the crane is mounted on the floor of a vehicle 3 ft. 6 in. high, the maximum hook height for lifting 3 tons (at 3 ft. 6 in. radius) is 7 ft. and for lifting 30 cwt. (at 6 ft. 6 in. radius) is 9 ft. Other features include one-man operation (a second handle is provided for two-man operation if required) swivelling pulley sheaves for side lifts, quick conversion from 3-ton to 30-cwt. rig, safety pins for luffing screw gear and lowering brake with enclosed ratchets.

Guy Arab in New Role

WHEELBASE of the smart new breakdown lorry illustrated on this page was originally 5 ft. 9 in. longer, when as a Guy Arab Mark I double-deck bus it entered service in 1942 with Crosville Motor Services, Limited. It spent much of its service life in the Crewe area and upon withdrawal late in 1955 it was purchased by Guy Motors, Limited, for its London depot. The chassis was shortened from 16 ft. 3 in. to 10 ft. 6 in. and a five-speed direct-top gearbox was fitted. A light alloy cab, similar to those fitted on the later Invincible Mark Is, was mounted, and the new bodywork was constructed in the Guy works. The Mann Egerton crane is of 5 tons straightweight lift. The former double-deck body was sold to a Wolverhampton operator, Happy Times Coaches, which mounted it on another utility Guy Arab Mark II chassis, where it is reported to be still giving excellent service.

Dagenite Battery Distributor

ON January 1 the distribution of Dagenite motor batteries in the United Kingdom and Republic of Ireland, previously undertaken by Holsun Batteries, Limited, as sales concessionaires, reverted to Pritchett and Gold and E.P.S., Limited, which is the manufacturer of Dagenite batteries. This change was for the purpose of administrative convenience and was one of form only. It in no way affects the sales policy under which Dagenite batteries have previously been sold. The main sales office remains at 137 Victoria Street, London, and all the company's depots are as at present.

Homalloy Expansion

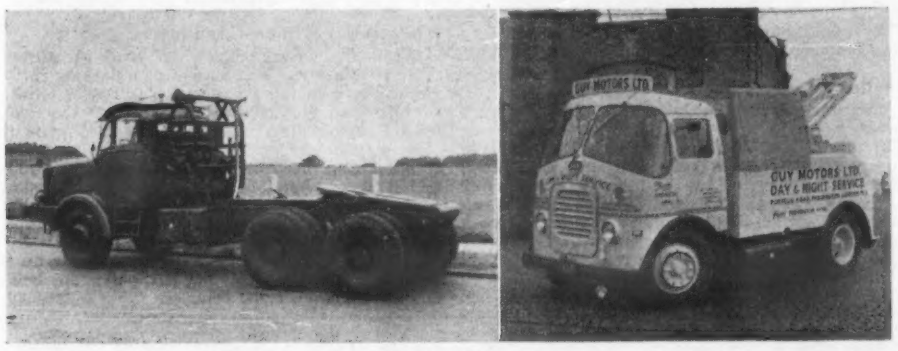
ON January 5, Holmes (Preston), Limited, Blackpool Road, Preston, manufacturers of Homalloy light alloy and plastics commercial vehicle bodies opened a new south eastern works, stores and service depot at Homalloy (London), Limited, Airport Works, Sutton Road, Rochford, Essex. The manager is Mr. S. C. Neve, who was formerly with Comjoints, Limited, and Pickfords.

Powerful C.D. Cab Heater

INSTALLATION versatility is a feature of a new commercial vehicle cab heater unit just introduced by Clayton Dewandre Co., Limited. The D9 heater has four removable and interchangeable outlet panels providing a controllable flap for variable cab heating and for up to six demisting nozzles to keep the large areas of glass in modern cabs free of condensate and ice. Measuring 8½ in. by 7⅝ in. by 7½ in., the unit has an output of 9,000 B.Th.U. per hr. (2⅝ kW) when the difference in temperature between ambient and engine water outlet is 120 deg. F. and 11,250 B.Th.U. (3¼ kW) when the temperature difference is 150 deg. F. The D9 can be fitted in a fresh-air or recirculatory arrangement and costs £11 5s. complete with two demister nozzles. Additional nozzles and hoses are available as required.

Versatility in Oilfields

THE latest Thornycroft Big Ben six-by-four heavy-duty tractors operated by Diadema Argentica S.A. de Petroleo, the Shell associate in Argentina, are now at work in the oilfields at Comodoro Rivadavia. They are being operated both as solo vehicles and as articulated outfits. As solo machines they carry Ideco Woodfield Hydrair well servicing units, but as an articulated vehicle the tractor is attached to a low-bed multi-wheeled trailer which carries a Wagner Morehouse T-2-37 drawworks unit and 90-ft. telescopic mast. These vehicles when loaded weigh approximately 40,000 kg., or nearly 39½ tons, and climb gradients up to 1 in 10 over rough, stony roads. The specification includes a Thornycroft-built all-metal cab, a robust headache rack with provision at the side for mounting a spare wheel, a Darlington 50,000-lb. winch, fifth wheel and tail roller.



One of the Thornycroft Big Ben 6 by 4 units now at work in the Argentine oilfields as described in an accompanying paragraph; right, Guy breakdown lorry developed from a wartime Arab bus chassis

New Normal-Control Bedford Lorry

IT is announced by Vauxhall Motors, Limited, that a 5-ton lorry with a full 16-ft. body has been added to the range of normal-control Bedfords and is now in production. Also available as a chassis or chassis and cab, the new model has a specification similar to that of the normal long-wheelbase 5-tonner with the following exceptions: the wheelbase is 14 ft. 11 in., compared with 13 ft. 11 in. for the normal long-wheelbase 5-tonner; only the 300 cu. in. engine (petrol or diesel) is fitted; the flat-topped frame of the LWB 7-tonner is used, with the 16-ft. body bolted direct on to it; the rear springs are cambered to suit the chassis height; the fuel tank holds 26 gal. as compared with 20 gal. on the normal 5-tonner, and the weights are:

		Kerb	*Taxation*
Diesel	Chassis and cab	6,140 lb.	5,744 lb.
	Dropside lorry	7,160 lb.	6,764 lb.
Petrol	Chassis and cab	5,800 lb.	5,430 lb.
	Dropside lorry	6,820 lb.	6,450 lb.
Gross vehicle weight		18,000 lb.	(8 tons 0½ cwt.)

Total prices for the diesel-engined model are £1,187 14s. 11d. for the chassis, £1,262 14s. 11d. for the chassis and cab, and £1,372 14s. 11d. for the dropside lorry. In each case £222 14s. 11d. represents purchase tax. Total price of the petrol-engined model is £150 less in each case with purchase tax representing £192 14s. 11d. of the total.

★

PROTECTIVE LACQUER

For Natural Wood

A CLEAR protective lacquer named Isocyne for use on natural wood grains, has been introduced by the British Domolac Co., Limited. It is said to be easy to apply and is for internal or external use and in extensive field trials it has withstood exceptional weathering conditions both in atmosphere carrying heavy chemical pollution and at sea. The principal properties of the new material are extreme durability coupled with excellent moisture, chemical and abrasion resistance. It adheres well and will not craze; it is cigarette burn resistant and is unharmed by alcohol or alkalis in normal dilutions.

Isocyne has been under active development for over four years and is currently being specified or tested by the Ministry of Works, London County Council, various county educational authorities, the Timber Research Association and the Building Research Centre, as well as various large public works contractors. It is also being used to finish boat fitments and for portable timber buildings for export and is being extensively specified on all regions by British Railways.

It's not hard to understand...

that is if you belong to the school of futuristic painting. But it's very much easier for you, Mr. Transport Operator, to understand and appreciate 104 genuine horsepower at 2,500 r.p.m. in the **PERKINS R6(V) MARK 2.**

Add to the 240 lbs-ft. torque and the fact that this high speed diesel engine will do every transport job faster, cheaper and more effectively than any comparable unit to-day, and not only does it thrive on being driven hard, but it has the combined attributes of long life and faithful service.

That it is installed by such internationally famous commercial vehicle manufacturers as Commer, De Soto, Dodge, Fargo, Douglas, International Harvester and many others, all of whom are now offering the **R6(V) MARK 2** diesel engine as standard equipment with their products. That it has 26 years of engine design and manufacture behind it and is backed up by a world wide spares and service organisation. The result? Whether it is to be a power unit in an entirely new chassis, or is for replacement of an existing unit, insist on the **PERKINS R6(V) MARK 2.**

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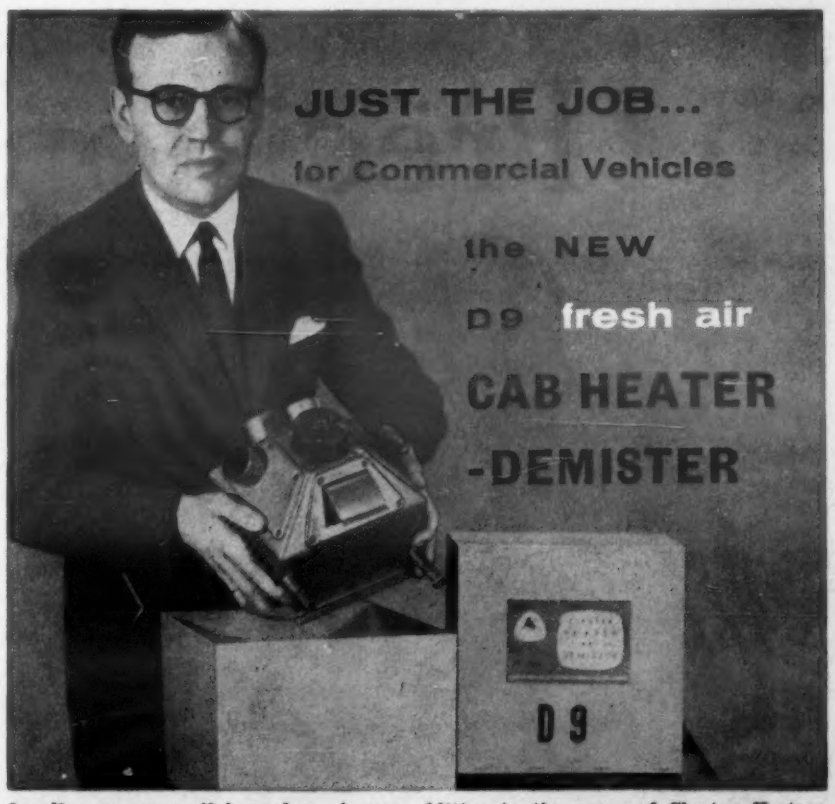

Specify your own outlet panels

BLANK

SINGLE DEMISTER OUTLET

TWIN DEMISTER OUTLET

FLAP CONTROLLED CAB HEATING OUTLET

PRICE: Only £11.5.0 for complete kit
(additional nozzles and hose available as required).
Write now for further information

A new addition to the range of Clayton Heaters designed to meet the requirements of most vehicles, the 'D9' combined cab heater and demister unit has four outlet panels, which can be supplied in any combination to feed up to six demister nozzles, as well as provide cab heating.

'D9' *gives 11,250 BTU's per hour at 150°F t.d.— equivalent to 3.3 kilowatts, with 105 cu. ft. per minute airflow.*

'D9' *is a fresh air heater providing ideal cab ventilation in all weathers.*

'D9' *comes in kit form complete with all the necessary parts, 2 demister nozzles and fitting instructions.*

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NEW COMFORT, new power and new running economy are built into this fine new range of forward control Commers. A wide-vision cab, a new six-cylinder diesel engine with chrome-plated cylinder bores, superlative engineering craftsmanship to give sturdy, long-lasting reliability—all backed by the superb Rootes service organisation.

Other outstanding features are:

- ★ All-steel 3 seat cab—cool, comfortable and *quiet*.
- ★ Handsome appearance.
- ★ Separate fully-adjustable driver's seat.
- ★ Effortless handling and manoeuvrability.
- ★ Deep, panoramic, one-piece windscreen.
- ★ Chrome bore petrol engine also available.

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FORWARD CONTROL 4, 5 & 6 TONNERS

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COMMER CARS LTD. LUTON BEDS. EXPORT DIVISION: ROOTES LTD. DEVONSHIRE HOUSE PICCADILLY LONDON W.1

NEWS FROM ALL QUARTERS

Road Out of Railway?

In Dublin, the city planning officer is collecting data on the feasibility of integrating the Harcourt Street—Bray railway line into the existing road network.

Panama Canal Bridge

Work has begun on a bridge, costing over £8 million, across the Panama Canal at Balboa. It is expected to be completed by October, 1962. The only canal crossings for vehicles at the moment are by ferry at Balboa, or by bridges at the Miraflores and Gatun locks.

Alweg Railway in U.S.A.

An Alweg railway, three-quarters of a mile in length, is to be opened on June 1 of this year in the Disneyland park of the Hollywood Walt Disney enterprise. Two three-car trains, three-quarters the size of the Cologne experimental unit, will be used for the transport of visitors. It is reported that there will be a two-minute headway.

Locomotive Manning in Italy

Talks on locomotive manning are due to be resumed between Italian railwaymen's unions and the management of the Italian State Railways. The decision of the management to use only one man on certain types of locomotive had earlier given cause to the Italian railwaymen's unions to call a strike for December 20 and 21. This strike notice was withdrawn pending discussions.

French Export Costs

The Union of Maritime Chambers of Commerce and of French Ports, has estimated that transport costs of exported goods will go up by 20.76 per cent, due to the suppression by the French Government of the preferential rail tariffs for exports—amounting to 8.50 per cent of the transport charge—in addition to a general increase in transport tariffs of 10.50 per cent. To these rises must be added the increase in shipping freight rates due to the devaluation of the franc.

Wider Travel Concession to Rail Customers

The British Railways business travel season ticket is now available to any firm or undertaking which makes a direct payment of £2,500 a year to British Railways in rail merchandise charges. The qualifying amount was hitherto £5,000 a year. These tickets can be used for an unlimited number of journeys over a route or group of routes (chosen by the holder) covering not less than 100 miles. They cost about 25 per cent less than an ordinary season ticket over the same routes.

Station Closures

Foulridge Station, on the London Midland Region between Colne and Skipton, was closed from January 5. On the North Eastern Region, Gristhorpe Station, on the Hull—Scarborough line, will close on February 16, and from February 2 Greenock Princes Pier and Greenock Lynedock stations (Scottish Region) suffer a similar fate when the service to Kilmacolm is withdrawn. Hatey and Epworth, Walkeringham, Sturton, Blyton, and Offord and Buckden stations on the Eastern Region also to close to passenger traffic from February 2.

German Rail Deficit

The German Federal Railway had a deficit in 1958 of about £53,800,000, attributed to a recession in basic industries, a drop in passenger traffic and increased wages.

Tokyo Station Claim

The Central Station in Tokyo, with 1,931 trains per day arriving and departing and a passenger total of 540,000 daily, is claimed to be the busiest railway station in the world. Some 17 through tracks, 14 of them with platforms, handle the traffic. Tokyo is now officially the world's most populous city.

Swedish Motor Transport Expanding

Road transport of goods has doubled in Sweden since 1950, according to an estimate made by the Swedish Automobile Manufacturers' Association. Over 80 per cent of the total volume of inland freight went by road in 1957, while as to the distances covered, 27 per cent was accounted for by road transport. The total of goods vehicles in 1957 was 115,000 and forecasts for 1965 and 1975 estimate their numbers at 140,000 to 170,000 and at 230,000 to 300,000 respectively.

British Student for U.S. Handling Course

The British Industrial Truck Association is sponsoring a British candidate to attend the 1959 Materials Handling Course at Lake Placid, U.S.A., directed by the Industrial Management Centre. The British award is made under the terms of a memorial to the first B.I.T.A. president, the late John M. Morris, and is valued at over £500. The memorial will take the form of an annual place at a suitable training establishment for someone who may benefit himself and his industry in the materials handling field.

Guaranteed Rail Delivery in Rhodesia

Rhodesia Railways is running a named fast goods train, the Railstar, nightly in both directions on the Bulawayo—Salisbury line. It is part of a complete service with guaranteed collection and delivery in the two cities and their established commercial suburban centres. Cartage areas have been extended and the contractors' lorry fleets are supplemented by railway vehicles, some of which are radio controlled. A definite undertaking is given to accept goods from town up to 5 p.m. Deliveries commence at 7.30 a.m. the morning following dispatch and are completed during the forenoon.

Multi-Storey Alpine Car Park

When the Grossglockner toll road in Austria reopens this summer extensive new parking facilities will be available for the cars and coaches which every day carry thousands of visitors to the Edelweiss Peak (7,600 ft.) and Franz-Joseph-Höhe, with their magnificent views. Very heavy peak period traffic during the height of the season, which may include several hundred coaches a day, has for many years presented a serious parking problem. At Freiwandeck, on the branch road to Franz-Joseph-Höhe, a multi-storey garage is now being built. The 600-ft. long structure will accommodate up to 850 cars, while the existing car parks are being extended to take 1,000 vehicles.

Precision

FIRST AND LAST

Pressed Steel

In the last ten years, Pressed Steel have produced enough railway wagons to make a train more than 300 miles long. Wagons of all kinds and all gauges for home and overseas. But sheer capacity—the ability to meet big orders and meet them quickly—is only half the story. The other half is just as important, even though it cannot be expressed in statistics—the finish, the painstaking attention to detail, the skill and experience of the men you see here.

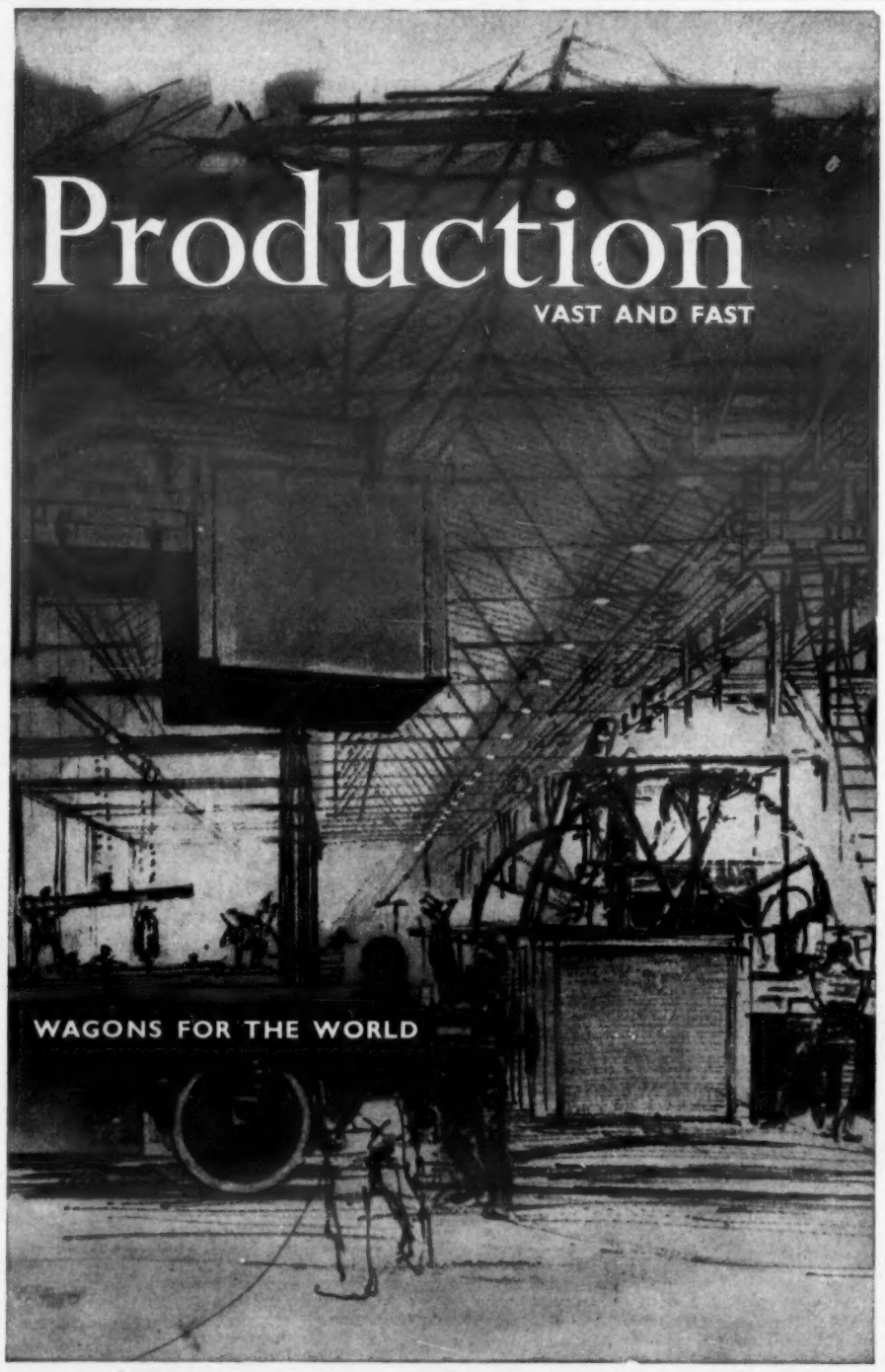
PRESSED STEEL COMPANY LIMITED

Railway Division: Paisley, Scotland. London Office Railway Division, 47 Victoria Street, S.W.1. Head Office: Cowley, Oxford.

Manufacturers also of Motor Car Bodies, Prestcold Refrigeration Equipment and Pressings of all kinds.

Production

VAST AND FAST



COMMERCIAL AVIATION

Decca Navigator Demonstrated

S.A.S. DEVELOPMENTS

ON January 19 a party of civil aviation observers flew in a de Havilland Comet for three hours over the Atlantic on a demonstration flight to see for themselves the working of the latest form of airborne Decca Navigator equipment, which enables a pilot to see exactly where he is and where he is going. This was the first of a series of demonstration flights in the United Kingdom, France and North America sponsored by the Ministry of Transport and designed to enable international observers to make their own assessments of the Decca system prior to the special meeting of the International Civil Aviation Organisation (I.C.A.O.) in Montreal next month. This meeting is being held to select an international standard aid to air navigation, and it is the considered view of the British Government that the latest type of Decca Navigator equipment best fulfils requirements.

The outstanding features of the Decca Navigator system are: The precision and ease with which planes can fly along airways, climb, descend and hold their positions in a stack; the precision and ease with which the pilot can report an aircraft's position, and that, with this system, it is possible to lay down new air routes with great ease to meet changing circumstances and thus make full use of the available airspace.

First Flight of Vickers Vanguard

The first Vickers Vanguard turboprop air liner made its first flight on January 20. Mr. G. R. Bryce, chief test pilot, Vickers-Armstrongs (Aircraft), Limited, reported afterwards that the flight from Weybridge to Wisby had been satisfactory and without incident.

Britannia to Doha

The British Overseas Airways Corporation has now started a regular weekly service with Britannias between London and Doha on the Persian Gulf. The service leaves London every Tuesday evening and flies to Doha via Rome, Beirut, Kuwait and Bahrain. It reaches Doha on Wednesdays. Flights in the reverse direction leave Doha every Thursday morning and arrive at London Airport the same evening.

C.A.A. Not to Seek Further Subsidy

The chairman of Central African Airways, Mr. A. E. P. Robinson, said recently in Bulawayo that the airline would not ask for any further subsidy during the current year, despite drops in traffic of up to 17 per cent a month compared with 1957. The only reason the corporation had not incurred a net loss in excess of the estimates prepared last April was due to the many savings effected and the process of reorganisation that had been taking place during the past year. The subsidy for the current year is £160,000.

New Services Approved

The Minister of Transport and Civil Aviation, after considering the recommendations of the Air Transport Advisory Council, has approved the operation of the following air services:

An inclusive tour service between Manchester and/or London and Basle; Eagle Aviation, Limited, until April 5, 1959.
An inclusive tour service between London (Blackbushe) and Innsbruck; Eagle Aviation, Limited, until April 11, 1959.
An internal service between Birmingham and Southend; East Anglian Flying Services, Limited, until July 7, 1962.
An inclusive tour service between Birmingham and Oslo; Derby Aviation, Limited, until March 30, 1959.
An inclusive tour service between Birmingham and Palma; Eagle Aviation, Limited, until April 12, 1959.

Date for S.A.S. Caravelles

Caravelle jet air liners will begin flying Scandinavian Airlines System routes to 24 cities in 17 European and Middle East countries on May 15. The airline has announced that it has started accepting passenger and cargo reservations for these services. European cities which will get Caravelle service this summer are: Copenhagen, Stockholm, Helsinki*, Dusseldorf, Stuttgart*, Munich, Vienna, Prague, Budapest, Geneva*, Milan*, Rome*, Athens and Istanbul (*from July 15). The Rolls-Royce powered Caravelles will also fly to eight cities in the Near and Middle East—Ankara, Beirut, Damascus, Baghdad, Basra, Tehran, Abadan and Kuwait and to Cairo and Khartoum.

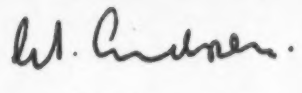
New Bulawayo Airport in Use

While carpenters and decorators still occupied much of the terminal building, Bulawayo's new £960,000 airport at Woodvale was brought into use on January 5 with Central African Airways' first Viscount services to the Matabeleland capital. The airport's official opening is due at the end of the month. It can take any aircraft at present operating within Rhodesia and Nyasaland and will act as an alternative to Salisbury. The two-floored terminal building contains restaurant, lounge and bar facilities. The concourse and public spaces of the terminal are being heated by a system of underfloor electric elements. Of the six hangars transported from Kumalo, one will house the fire station, one freight and engineers, and the other four will be leased to aircraft operators. The main runway, of which the present length is 6,600 ft. and width 150 ft., and ultimate length obtainable 10,800 ft., is designed to take an equivalent single isolated wheel load of 60,000 lb.

New S.A.S. Booking System

Scandinavian Airlines System on January 17 opens its new air terminal in Copenhagen. This terminal, which is part of S.A.S. 22-storey Royal Hotel now under construction at high speed, includes an electronic reservations system. The section now completed includes, in addition to the reservations department, a complete travel bureau, bank, car hire service, hairdressers, barber's shop, bar and a garage with space for 120 cars. The electronic computer in the reservations department contains 640,000 memory cells. Information regarding the booking situation on all S.A.S. routes and connecting lines is electronically fed into the brain. This means that it can supply information regarding available space on 50,000 different routes. It also serves as an information centre giving estimated arrival and departure times of all S.A.S. flights. The computer is connected with 39 push-button interrogator sets operated by reservations clerks. It answers within ½ sec. whether or not space is available on the required route. Should there be no space on the requested flight, it supplies up to nine different alternative routings and flights. These interrogator sets now installed in the new air terminal and other points in Copenhagen are the first of a network which is to include S.A.S. London, Birmingham, Manchester and Glasgow offices.

THE NEW C.I.E.



Dr. C. S. ANDREWS, B.Com., D.Econ.Sc.

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Appointment last September of Dr. Christopher Stephen Andrews as chairman of Coras Iompair Eireann led those who knew the energy he had displayed in building up Bord na Mona—the Turf Development Board—to expect the promulgation of a vigorous policy for reviving the fortunes of the Irish transport company. These expectations were fulfilled on Tuesday of last week when, with the title of "The New C.I.E." he announced a programme which included the complete revision of the charging system for freight traffic, intensive study of the possibilities of container traffic and other steps calculated to give the railway system a chance to recover in the five-year period of grace which the Irish Government has allowed it. Born in Dublin in 1901, Dr. Andrews, known throughout the Republic as Tod, was educated at Synge Street Christian Brothers Schools and University College, Dublin, where he graduated as bachelor of commerce. From 1917-21 he served in the Dublin Brigade of the Irish Republican Army. In 1926 he became accountant to the Irish Tourist Board and then, in 1930, he joined the Electricity Supply Board as senior accounts inspector. When the Turf Development Board, now Bord na Mona, was set up in 1934, he became its first managing director and occupied that post until last autumn, when he resigned following his new appointment. His achievements in that period of 24 years led to various tasks being delegated to him, including that of Fuel Director, which post he occupied from 1943 to 1946. He was also made an honorary doctor of economic science for his work with Bord na Mona. In 1938-39 he served as a member of the Drainage Commission and he has been a member of council of the Irish Management Institute. Author of a number of articles and reviews, he has also contributed to the proceedings of the Statistical Society. The re-establishment of C.I.E., which now, of course, incorporates the Republic's share of the Great Northern Railway Board's undertaking, will be no easy task, but neither was the bringing of turf production and utilisation on to a sound commercial basis, and the chairman with his anxiety to do things the day before rather than the day after—unlike the legendary Irishman—is obviously determined to live up to his promise to "spare no effort to serve C.I.E. and the country."

NEW METSEC BUS

Ribbed Panelling

BRINGS WEIGHT SAVING

UNDER the title *A Bus in a Box*, a new brochure issued by Metal Sections, Limited, Oldbury, Birmingham, describes and illustrates the various road vehicle bodybuilding materials produced by the companies in the Tube Investments Group. The company does not build bodies but during its 25 years' or so experience of prefabrication techniques it has initiated many designs incorporating fully fabricated components, which have been supplied in knocked down condition for assembly by customers all over the world. Materials used in the components comprise cold-rolled sections by Metal Sections, solid-drawn steel tubing by Accles and Pollock and panels and mouldings by Reynolds T.I. Aluminium. Tubular seats are also supplied by Accles and Pollock as required.

The brochure illustrates the simplicity of assembly and compactness of the company's system of packing the complete framings for single- and double-deck buses, lorry and van cabs and bodies and containers, which shows a considerable saving in freight charges for shipment overseas. As an example, a complete 33-seat bus set, including framing, panels and mouldings, screens and windows, Pop rivets and tools, wheelboxes and step pans, packs into a box of only 175 cu. ft. capacity and has a total gross weight of about 1 ton 12 cwt. (1,630 kg.)

New Design Technique

A leaflet also just published describes a new Metsec single-deck bus incorporating ribbed section construction and having the same facilities of compact knocked-down bulk and simple assembly. Advantages claimed for the design, in which the structure and panelling are one, are considerably reduced assembly and finishing time; enhanced appearance and elimination of mouldings; great strength combined with lightness; wider adaptability to varying chassis; reduction of assembly jigs required; and bay size independent of underframe layout.

The system employs main body sides of wide ribbed and flanged sections or planks of 18 s.w.g. cold-rolled aluminium alloy to specification TI222½H laid longitudinally and bolted together. The sections below waist level are treated with suitable paint at the flanges and the lowest section can be fitted as a hinged flap where necessary. At the crossbar position at the third section down from the waist, stiffeners are inserted for attachment of the crossbars. One wide pillar is riveted at each end of the assembled sections and acts as a stress bay to transmit the loads to the roof girder. Interior panels of 20 s.w.g. aluminium alloy are attached by blind rivets from the waist to the seat rail position and from the seat rail to the bottom of the third plank. Interior panels are fitted in two parts to facilitate removal in the event of extensive damage to the side section.

Continuous Cantrail Girder

Two intermediate pillars are fitted from waist to solebar to preserve side contour in conjunction with the main end stress pillars. Spacer pillars are fitted between the waist and cantrail for the attachment of window panels. The cantrail girder, which is a cold-rolled section of 20 s.w.g. mild steel, forms the roof quarter panel and is continuous from the front corner pillar to the rear stress pillar. It is fitted with stiffeners at the joints of the inside panels, which can be coved or flat as required.

The central portion of the roof is fabricated from top-hat sections in either mild steel or aluminium alloy and has two angle longitudinal boundary members which fit into recesses in the cantrail girders, where they are bolted into position. The roof centre is made as a unit and panelled with aluminium alloy; the inside cove and ceiling panels are blind-riveted to it. The rear of the body side, which is a one-piece polyester-glass fibre moulding reinforced with light angle framing, comprises the rear quarter, rear corner and rear corner dome and is riveted to the cantrail girder and rear stress pillar. The rear-end framing is made from cold-rolled sections panelled with aluminium alloy and is bolted to the side resin-glass mouldings. Front framing and underframing are of orthodox construction.

Repair of accident damage to the new Metsec structure is straightforward. Small dents and abrasions can be filled with any of the plastic metal preparations in use today and more seriously pushed in and bent sections can be straightened after removing interior panelling and planished. In trials carried out by Metal Sections, Limited, a heavy lorry has been run into the side, forcing it in as much as 12 in. from parallel. The sections are said to have bent under this impact but not to have buckled or fractured and a repair was made by straightening and planishing. Where damage is very severe and sections are torn and broken, the damaged sections can be cut away and new pieces inserted and sleeved at the joints.

★

KENT REFINERY

New B.P. Booklet

INSPIRED by the great postwar expansion of oil refining in the United Kingdom, construction of B.P.'s Kent refinery on the Isle of Grain was begun in the middle of 1950 and the first crude oil processed in February, 1953. Since then the refinery has grown to its present throughput capacity of 7,200,000 tons a year by a series of planned stages. To mark the completion of the latest expansion project, the British Petroleum Co., Limited, has issued a handsome new booklet, *B.P. Kent Refinery*, which, in text and photographs, traces the construction work from the earliest days to the present. Copies of the publication can be obtained on application to the company's Information Department, Britannia House, Finsbury Circus, London, E.C.2.

Building operations of Kent Refinery had their beginnings in a quagmire and rose at times to a crescendo of activity when as many as 8,000 workers swarmed on the site. Originally planned for a throughput capacity of 4 million tons of crude oil a year, a £30 million expansion programme was begun in 1956 to increase this to over 7 million tons a year. This project, which involved the erection of 21 new units, including plant for the production of 40 million gal. of aviation petrol a year, is now complete. Today Kent Refinery has 2,900 employees working in shifts around the clock. It has its own deepwater port and nearly 800 miles of pipelines carry the crude oil through the refinery until it is ready to be marketed as products, 90 per cent being carried away by water, the rest by road and rail.

WESTINGHOUSE

HAS HELPED TO KEEP
SAFELY ON THE MOVE
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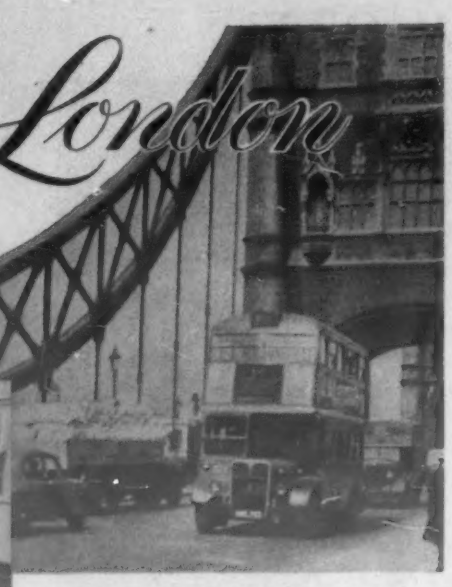
London

A modern signal control panel, one of many made by Westinghouse for London Transport



Large numbers of London Transport buses are equipped with Westinghouse Air Brakes

The new London Transport Trains are being equipped with Westinghouse Brakes

SINCE 1903, when automatic signalling was first installed on the Metropolitan District Railway, Westinghouse Power Signalling has been used on all the lines of the London Transport System throughout its development and modernisation.

The rolling stock has also been equipped throughout with Westinghouse Air Brakes, and is now being modernised with the latest type of Westinghouse Electro-Pneumatic Brakes.

On the roads also, large numbers of London's buses are fitted with Westinghouse Air Brakes.

Such extensive use of

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is a striking tribute to their safety, reliability and reputation—a reputation of which we are justly proud

WESTINGHOUSE BRAKE AND SIGNAL CO. LTD., 82 York Way, Kings Cross, London, N.1

Telephone: TERminus 6432

OFFICIAL NOTICE

RURAL DISTRICT COUNCIL OF DARTFORD

APPOINTMENT OF TRANSPORT AND PUBLIC CLEANSING OFFICER

APPLICATIONS are invited for the post of Transport and Public Cleansing Officer. Salary Grade APTII plus £30 per annum London weighting (£755 to £875 per annum). Commencing salary according to qualifications and experience. Preference will be given to Candidates who are Corporate Members of the Institute of Transport or who hold the Testamur of the Institute of Public Cleansing. A car will be provided for use on official duties. Housing needs will be considered. Form of application which may be obtained from the Engineer and Surveyor at the address below should be returned to him on or before February 9.

J. H. MILBURN,
Clerk to the Council.

White Oak,
Swanley, Kent.

'sno use being all askew!

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LETTERS TO THE EDITOR

Work Study in Transport

The Editor is always glad to receive letters from readers on subjects germane to the transport industry, but these should be written as concisely as possible. The opinions expressed therein must not, however, be regarded as having editorial endorsement. Where correspondents desire to use a nom-de-plume it is essential that the Editor should be informed of the name and full address of the writer as indication of good faith.

SIR,—I read with great interest the abstract in your issue of January 10 of Mr. McKenna's paper, "Work Study in Transport," that was read before the Metropolitan section of the Institute of Transport. As an operating man myself, I was particularly interested in the application of work study to signalmen, and I have given a considerable amount of study to the matter. I had reluctantly come to the conclusion that signalmen were unable to claim any admittance to the scheme. But I am not so sure now.

Mr. McKenna does not, however, give any hint of how such application is to be administered, and in any case, it is obvious that a lot of great difficulties will have to be overcome. As a special class relief signalman, I have taken charge of a widely varied selection of signalboxes, and the difference in the duties can be vast. In class 4 countryside signalboxes, on possibly a single line, there is not the density of traffic that one would deal with in a power-operated box of special C category, and thus, the lower-rated signalman is going to be denied the opportunity of incurring any incentive bonus. In any case, to a large extent, a signalman's duties are already subjected to a careful survey by means of the existing marks scheme, and any fresh scheme is almost bound to be subject to a critical scrutiny by the trade unions.

Careful Application Needed

I know it is generally thought that the railway industry offers a wonderful opportunity for the application of work study, and it probably does, but it must be skilfully administered when signalmen's duties are being calculated, because they differ in one vital aspect from almost every other grade—the duties they performed on Monday, and the resultant lever movements they made with a given timetable, are invariably different on Tuesday, with the same number of trains and the same timetable. Work study, one feels, can only be applied to signalmen on an efficiency basis, and on no other system. If this is so, then it can be applied in such a manner that the punctuality competitions can be dispensed with entirely, and a rapid improvement would soon show in the timekeeping of passenger, and C headcode freights, but I fear for the timekeeping of other freight trains.

If only the work study authorities could work in close conjunction with the department responsible for modernisation, then there is no limit to what could be done, and that includes signalboxes and marshalling yards, but I am informed that work study is only correctly applied when it does not bring about any additional expenditure. Margam Yard will show what automation can do, and eventually, of course, it will show receipts, but the expenditure must be enormous, and to try to adopt a similar type at every yard on the system, is out of the question.

Were some expenditure allowed the work study specialists in regard to signalboxes, there is no limit to its capabilities. I have studied very closely the centralised traffic control systems in use in other countries, and I have yet to meet with one likely to receive Ministry of Transport approval. With all the added security methods that the Ministry would be bound to ask for, the result would not be a C.T.C. system, but an exaggerated form of route relay. The fact remains, that there are certain sections of the line, that could bring into operation immediately a form of remote control over several miles of block sections now worked by several small boxes, and with a considerable reduction in general operating costs. I can think of several in my own district, and it literally makes me rave to think of such a wonderful opportunity going to waste, and all because it has been decreed that money must not be spent. Just visualise continuous track circuiting, colour-light multi-aspect signals 1,500 yd. apart, and just a good train describer. I wish they'd let me spend the money—I know what I want.—Yours faithfully,

C. P. LOVEMORE.

13 Elliston Road,
Redland, Bristol, 6.

Piggyback Wagons

SIR,—In your leader, "Fighting Back," of January 10, you quoted Mr. Whitworth as saying, inter alia, ". . . The conventional terminal should in fact be eliminated and replaced by pallets, containers, piggybacks (if British loading-gauge difficulties could be overcome). . . ."

I have a suggestion that might be worthwhile considering if there is sufficient piggyback traffic available—and I have no doubt that there is, chiefly because of speed of delivery, the savings of drivers' wages, and wear and tear on the lorry, and so on. Presumably height is the ruling factor because, except for unusual loads, lorry width is restricted to 8 ft. If this is so, then the difficulty lies in the height of the floor of the rail wagons, and this is governed by the regulation height above rail level of couplings and buffers. If the height could be lowered and coupled with the ease of driving on and off, presumably the problem would be solved.

Possible Solution

The solution might be to construct a rake of four articulated 60-ft. flatcars, with four-wheel bogies at each end of the rake and three six-wheel bogies supporting the other ends of the adjoining cars. The wheels of the bogies would be the smallest diameter permissible for main-line running. This would mean a very low wagon height which would enable most lorries to travel on them and be within the loading gauge. At each end of the rake there would be a match wagon with buffers and couplings at normal height at one end and at rake height at the other. Two or more rakes could be coupled together and match wagons would then be required only at each end of the train.

These rakes of flatcars could be loaded by the lorries running on to them over ramps, either up from the ground or down from a platform. The match wagon at one end of the rake, or train, would not be coupled up until all the lorries had been driven on board. At the destination, one of the match wagons would be detached and drawn away before unloading began. On the other hand it might be worth while designing the match wagon in a way which would enable it to be used as a loading ramp from normal platform level.

In putting forward these suggestions, I have assumed that piggyback traffic would be between main centres such as London, Glasgow and Manchester.—Yours faithfully,

G. RICHARD PARKES.

The Thorns, Park Road,
Hadfield, Manchester.

Comparing Railbuses

SIR,—Now that all five makes of diesel railbus are in service on British Railways, it is interesting to compare some of their "vital statistics" and speculate on which will prove to be the most successful dimensionally.

The body length-wheelbase ratio has some bearing on comfort and stability; the weight-length figures give an indication of the lightness of construction; and the weight-passenger figures are of economic interest in connection with fuel consumption.

COMPARISON OF BRITISH RAILWAYS RAILBUSES

Make	*A.C.*	*Wickham*	*Bristol*	*Park Royal*	*W.M.D.*
Engine	*B.U.T.*	*Meadows*	*Gardner*	*B.U.T.*	*Büssing*
B.h.p. rating	150	105	112	150	150
Wheelbase	19 ft.	22 ft.	19 ft. 8 in.	19 ft. 8 in.	41 ft. 10 in.
Body length	36 ft.	38 ft.	42 ft. 4 in.	42 ft.	
Number of passengers	46	44-48	56	50	56
Tare weight, tons	11.0	11.5	13.5	15.0	15.0
Laden weight, tons	15.6	15.9-16.3	19.1	20.0	20.6
Length/wheelbase	1.895	2.000	1.924	2.133	2.325
Lb./foot length	684	678	714	800	803
Lb./passenger	536	586-537	540	672	600
B.h.p./ton tare	13.64	9.13	8.30	10.00	10.00
B.h.p./ton, laden	9.62	6.60-6.44	5.86	7.50	7.28
B.h.p./passenger	3.26	2.39-2.19	2.00	3.00	2.68

As far as looks are concerned, appearances are likely to be deceptive. The Park Royal vehicle (which is 42 ft. long) is only 11 ft. 8½ in. high, whereas the Wickham vehicle (which is 38 ft. long) is 12 ft. 7 in. high.—Yours faithfully,

P. N. D. PORTER.

P.O. Box 1065,
Tehran, Iran.

Standardising Measurements

SIR,—Your Current Topic, "The Yard and the Pound" in your January 17 issue, reporting the adopted standards for these measurements being based on relative equality of metric units headlines the utter futility of continuing the use of Imperial measurement. To recognise the existence of the useful and sensible metric method, and then define an irrational, illogical method as a subsidiary thereof is quite absurd. There are more important things to do in this world than to fool about with quarters, bushels, rods, poles or perches, all of which are in any case arbitrary, and it is about time that the laggards got into step. The change is inevitable, and delay will only make it more difficult when at last it is accepted.—Yours faithfully,

E. RELTON.

2 Chesterfield Road,
Leyton, E.10.

Forthcoming Events

January 26.—Institution of Electrical Engineers. Faraday Lecture by Mr. H. A. Thomas, "Automation." At Royal Festival Hall, S.E.1. 6 p.m.

January 27.—Institute of Transport (Leeds G. and S.). Paper by Mr. W. J. Crosland-Taylor, "The Passenger is Always Right." At offices of Leeds City Transport, 1 Swinegate, Leeds, 1. 7 p.m.

Institution of Railway Signal Engineers (Bristol). Paper by Messrs. J. P. Coley and A. Webster, "C.T.C. Systems and Possible Applications." At Bristol Temple Meads Station. 6 p.m.

Omnibus Society. Presidential address by Mr. Norman Morton. At Restaurant, Victoria Coach Station, Buckingham Palace Road, S.W.1. 6.45 p.m.

Institution of Locomotive Engineers. Films, "The Third River," "Glass," also film describing Calder Hall. At Institution of Mechanical Engineers, 1 Birdcage Walk, S.W.1. 5.30 p.m.

January 28.—N.E. Coast Institution of Engineers and Shipbuilders (Tees-side). Paper by Mr. A. Bowman, "The Use of Welding in Ship Repair Work." At Cleveland Scientific and Technical Institution, Corporation Road, Middlesbrough. 6 p.m.

January 31.—Permanent Way Institution. Annual conversazione. At B.T.C. Headquarters, 222 Marylebone Road, N.W.1. 5.30 for 6 p.m.

OFFICIAL NOTICE

THE TRENT MOTOR TRACTION CO., LIMITED

ASSISTANT TRAFFIC MANAGER

THE Trent Motor Traction Co., Limited, invites applications for the post of Assistant Traffic Manager.

The Company, whose headquarters are in Derby operates a fleet of some 413 buses and coaches—mainly in Derbyshire and Nottinghamshire—on stage carriage and express services, excursions and private hires, and extended tours in Great Britain.

Applicants should have experience in road service licensing and traffic court procedure, duty scheduling and other departmental traffic work.

The commencing salary will be dependent upon the qualifications and experience of the successful applicant.

Applications, which will be treated in strict confidence, should be sent under "Private" cover to the General Manager, Trent Motor Traction Co., Limited, P.O. Box No. 35, Uttoxeter New Road, Derby, giving full particulars of the applicant's education, qualifications and career (including his present and all previous appointments) with a front cover sheet showing:

1. Name and Address.
2. Age.
3. Whether single or married, and in the latter case the number and ages of any children.
4. Present appointment.
5. Present salary.

Applications should be received not later than January 31, 1959.

HERTFORD NORTH LINE RECONSTRUCTION

Intensive Engineering Work Aided by Bus Operation

FULL DIESEL SERVICE NEXT JUNE

BY taking bold and imaginative action, the Great Northern Line of the Eastern Region is giving proof of its determination to improve the Kings Cross suburban services at the earliest possible moment. As a result, passengers on the Hertford North branch will begin to reap the first major advantages of modernisation in June this year instead of some 18 months later.

As from June 15 all services on the branch will be operated by diesel-hauled or diesel multiple-unit trains capable of giving a far better performance than the 0-6-2 steam tank engines used at present, with an improved service to give:

(*a*) More trains between Hertford North and London in the peak hours. Grange Park will be used as the terminal for certain extra trains.
(*b*) Faster timings—as much as 10 minutes less on certain trains.
(*c*) Skip-stop services in the peaks. Straight comparisons of train services are not possible because of these, but from Finsbury Park to Palmers Green the 14 trains between 4 p.m. and 7 p.m. will become 16.
(*d*) A regular half-hourly service off peak.

Speed Restrictions

It will be impossible, however, to realise the maximum improvement unless the present speed restriction of 40 m.p.h. with special dispensations to 50 m.p.h. between Wood Green and Hertford North can be raised. To make the upper limit 70 m.p.h. involves very extensive work on the track. It is due to be done in any case as an essential preliminary to electrification, but in the normal course of events it would have been spread over some two to three years. During that time passengers would have had to suffer the inevitable delays caused by single-line working and heavy speed restrictions.

To avoid prolonged inconvenience to passengers the traffic manager, Kings Cross, in consultation with the chief civil engineer, Eastern Region, reached the conclusion that the only satisfactory solution to the problem is to cut across normal procedures and to take drastic action to ensure that by June, when the all-diesel service is brought in, the engineering work will be largely complete and the speed limit raised to 70 m.p.h. over almost the whole 14½-mile branch. In other words a short sharp agony is preferable to a long drawn-out process.

Concentrated Renewal Work

For the work to be done in time, it is essential for the engineers to concentrate their resources of labour and equipment and to be given prolonged periods of working uninterrupted by the passage of trains. Accordingly these arrangements have been made:

(a) In order to concentrate the work, the 6½-mile section between Wood Green and Crews Hill will be tackled first. Work will start on February 1 and will be completed before the end of March. The remaining section between Crews Hill and Hertford North will then be taken in hand.

(b) To ensure freedom from interference, the train service over the section given over to the engineers will be replaced by buses, *except during the morning and evening peak periods*, when a near-normal train service will operate (up in the morning, down in the evening) over the whole branch. The buses will call at the stations and will be available to railway ticket holders only.

(c) The small amount of freight traffic now handled at Watton and Stapleford will be dealt with at Hertford, Knebworth or Langley during the whole operation, in order to provide accommodation for passenger coaching stock at night between Hertford and Langley. Locomotives will be worked in and out of service to pick up their trains via Hitchin and Langley or via Hatfield and Hertford North.

Details of train and bus services are contained in a revised timetable which, together with an explanatory note by the traffic manager, Kings Cross, will be available for passengers on Monday, January 26.

Still Better Service Next Winter

It will be necessary for further work to be done during weekends for some months, but by the time the winter, 1959, timetable comes into force it is confidently expected that, as a result of experience gained during the summer and the lifting of the speed limit to 70 m.p.h. over virtually the whole branch, a further improved and faster service will be possible. The inconvenience caused to off-peak travellers by these arrangements is regretted, but it is considered that this is not a large price to pay for such an acceleration of the date of introduction of the improved service and it is felt that the public as a whole will strongly approve of this aggressive drive which has no other object than to give passengers quick benefits.

The train time from Kings Cross to Hertford North is at present 57 min. The worst combination of train and all-stations bus time over the journey will be 103 min. for the 19¼ miles; by express bus, calling at certain stations only, the time will be 91 min. At certain stages of the work passengers will travel by train from Kings Cross to Wood Green, then by bus to Crews Hill and onwards by train to Hertford North and that combination journey will take 87 min. There will be a lorry service operated in conjunction with the buses, on roundly an hourly timing, to carry perambulators and heavy luggage.

Engineering Work

The engineering work is divided into two parts. Firstly, where the lower formation is in good condition, but the surface ballast is dirty and does not allow water to drain out of it, the track is to be reballasted to a depth of about 12 in. under the sleeper bottom. Approximately 24 single track miles between Bowes Park and Hertford North have to be dealt with in this manner. This work will be carried out during the week, between peak passenger services, in 20-hour cycles.

The second case is where the lower formation consists of poor clay and more extensive formation renewal and blanketing is necessary. This consists of the excavation, to a depth of 3 ft. to 4 ft. below the sleeper bottom, of all old ballast and clay, the provision of a sand cushion on the clay formation, and new ballast. This work can only be carried out in periods of long possession, and the work will be done during 40-hour possessions at weekends.

In addition to these two formation renewal operations, all existing drainage will be overhauled, a number of new drains provided, and the whole of the track re-aligned and re-canted for the higher speeds. A number of embankments will also be trimmed and stabilised.

Movement of Materials

The curtailment of train services on the line enables the civil engineering work to be carried out with maximum speed and economy. Considerable detailed planning has been necessary to dispose of approximately 400 wagons of spoil each week, and to bring in the train loads of new material required. Sand and gravel will be obtained locally, as far as possible, but special trains of new slag ballast in hopper wagons will be brought from Scunthorpe at a rate of 500 tons per day. The ballast cleaning and excavating operations will be as fully mechanised as possible, using a mechanical ballast cleaner which will cover 500 yards a shift, mechanical track tampers, and various types of earth moving plant. As the ballast cleaning machine takes some time to set up, the ideal working conditions will be achieved by the longer possessions possible under the proposed scheme. The same applies to excavation for blanketing; only 100 yards can be covered in a week of short possessions. A complication is the diversion at certain early summer weekends of main-line trains by the Hertford North route while the changeover of track through the new Potters Bar tunnel is taking place.

It is intended that all the ballast cleaning works will be completed by mid-June, and that the remainder of the blanketing work will be completed during weekends only, by the end of the year. Blanketing is necessary near Palmers Green, Winchmore Hill, Crews Hill and between the north portal of Ponsbourne Tunnel and Bayford. Before the beginning of 1960 it is expected that the whole of the line from Bowes Park to Hertford North will be suitable for trains to run at speeds of up to 70 m.p.h.

★

LONDON TROLLEYBUS CONVERSION

Stage 1 Programme

IT is now announced that Stage 1 of the 13 stages of the London Transport trolleybus replacement scheme will be introduced on March 4 (not March 1 as first announced). Taking three years, the whole will cost £10,500,000. The trolleybuses to be replaced have operated for 20 years and are now steepening in overhaul cost. Each has run 900,000 to 1 million miles. In the first stage Carshalton depot deals with 26 trolleybuses scheduled daily and Bexleyheath depot with 65. All the March 4 charges will be covered by RT type A.E.C. buses.

The bus services to be introduced illustrate the close integration with the rest of the bus system now possible, with a number of useful new connections such as Morden—Croydon and Orpington—Erith—Woolwich. A summary of the route changes is given below:

WOOLWICH—DARTFORD AREA

WITHDRAWN
Trolleybus routes
696 DARTFORD — Bexleyheath — Welling — Plumstead — WOOLWICH (Parsons Hill).
698 BEXLEYHEATH — Erith — Plumstead — WOOLWICH (Parsons Hill)

INTRODUCED
Bus routes
96 DARTFORD — Bexleyheath — Welling — Plumstead — WOOLWICH (Parsons Hill). (Daily). Extended at peak hours on Mondays to Saturdays to VICTORIA WAY (Woolwich Road)
195 ELTHAM (Well Hall Station) — Blackfen — Bexley — Bexleyheath — Welling — Plumstead — WOOLWICH (Parsons Hill). (Daily.)
177A ABBEY WOOD ESTATE (Grovesbury Road) — Eynsham Drive — Basildon Road — Bostall Hill — Plumstead High Street to WOOLWICH (Parsons Hill). (Mondays to Saturdays).

AMENDED
Bus routes
132 ELTHAM (Well Hall Station) — Blackfen — Danson Road — Bexleyheath — ERITH (Mondays to Fridays and Saturday afternoons). On Saturday mornings and evenings and on Sundays, route 132 will operate between Eltham and Bexleyheath garage only.
229 ORPINGTON — Sidcup — Bexleyheath — Erith — Plumstead — WOOLWICH (Parsons Hill). (Daily). Extended at peak hours on Mondays to Fridays to VICTORIA WAY (Woolwich Road)
124 FOREST HILL — Grove Park — ELTHAM — (peak hours) BLACKFEN. Extended on Sunday afternoons to BEXLEY HOSPITAL.

CRYSTAL PALACE—SUTTON AREA

WITHDRAWN
Trolleybus route
654 CRYSTAL PALACE — Anerley — West Croydon — Wallington — Carshalton — SUTTON GREEN.

INTRODUCED
Bus route
154 CRYSTAL PALACE — Anerley — West Croydon — Wallington — Carshalton — Sutton — MORDEN STATION (Mondays to Saturdays). On Sundays route 154 will run between Crystal Palace and Sutton Green only.

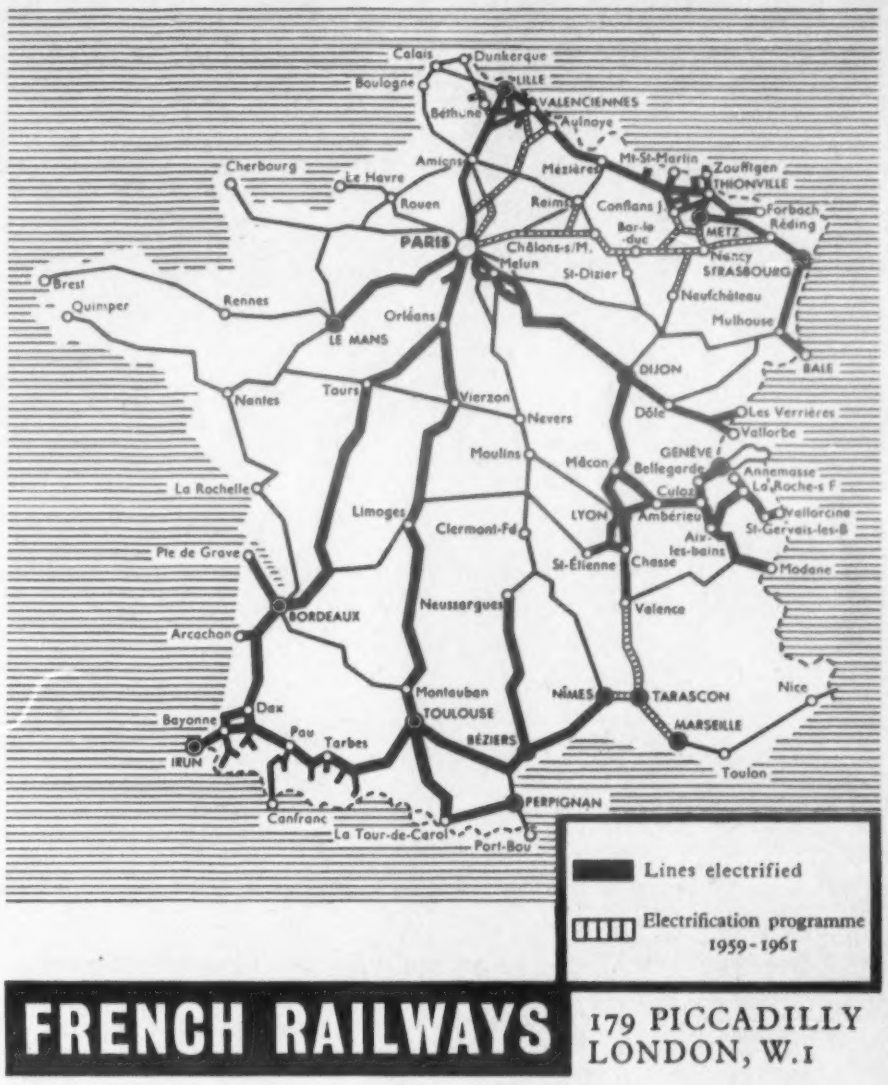
AMENDED
Bus routes
64 ADDINGTON — West Croydon — Anerley — ELMERS END GARAGE (Mondays to Saturdays). On Sundays the route will operate between Addington and West Croydon only.
157 CRYSTAL PALACE — Anerley — West Croydon — Wallington (Park Lane) — Wrythe Lane — Morden — RAYNES PARK (Daily).

It may be noted that Route 157 is being withdrawn from its present route between Park Lane and Belmont Road in Wallington.

Free tickets for admission to and full details of the eighth National Power Farming Conference at Harrogate on February 10, 11 and 12, at which 10 papers on the theme Machinery and Men will be presented, can be obtained from the organiser at Dorset House, Stamford Street, London, S.E.1.

As a result of negotiations and tests extending over four years, six of the principal models of Nu-Swift pressure-charge-operated fire extinguishers have been approved by the West German Government, the first British-made extinguishers to be approved for sale and use in the Federal Republic of Germany, where requirements are exceptionally exacting.

ELECTRIC TRACTION IN FRANCE



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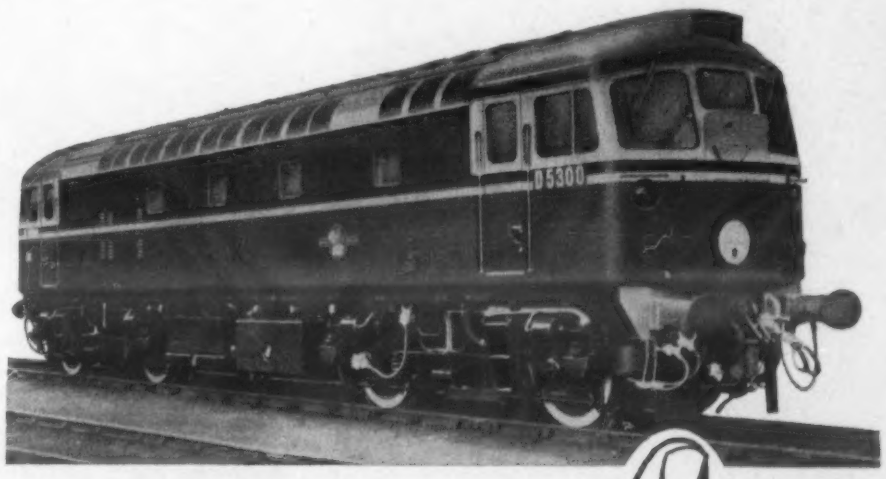

A fine job

D.5300 was the first into service of a batch of thirty-eight British Railways Type 2 1160 h.p. diesel-electric locomotives having electrical equipment supplied by Crompton Parkinson. These are being built by the Birmingham Railway Carriage & Wagon Co. with Sulzer engines.

The generators are of our well-known compact design having direct driven recessed auxiliary generators and rotatable brushgear. Ventilating air exhausts directly through the locomotive floor.

The motors are of a pattern common to 93 locomotives of B.R. Types 2, 3, and 4 for which we are supplying the electrical equipment, and are designed especially for diesel-electric service; they have rotatable brushgear and are particularly easy to maintain. The various sizes of auxiliary motors, too, were especially developed for rigorous traction duty. The control equipment is housed in a cubicle ventilated with filtered air and is built by Allen West to our requirements.

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Some Aspects of Road Passenger Transport

(*Continued from page 5*)

extent of viewing and the public appeal, attracting people to remain indoors rather than travel either to outside entertainment or to other forms of social activity. A further indication of the downward trend in the level of travel is given by the following record of cinema attendances extracted from the *Monthly Digest of Statistics*, October, 1958 (Table 3).

TABLE 3.—CINEMAS—GREAT BRITAIN
NUMBER OF ADMISSIONS

Per annum	*Millions*	*per cent decrease*
1953	1,284.5	—
1954	1,275.8	0.68
1955	1,181.8	7.37
1956	1,100.8	6.85
1957	914.9	16.89
	Total (per cent)	31.79

These trends are unfortunately already well known to all operators, but they will not be altered or corrected by being ignored. On the contrary, they must be kept in the forefront of our minds—they must influence us in the decisions which we make from day to day on all matters relating to our business, so that all our efforts are directed not only to retaining existing traffic but to regaining lost traffic.

Congestion

Technical progress in vehicle design has been entirely negatived by a failure to control the user, and if control is not exercised the constantly increasing number of motor vehicles using our roads will lead to a state of stagnation of movement of all vehicular traffic. While it is recognised that many road improvements are now in progress, it is clear that the pace of vehicle growth will continue to outstrip road development for some time to come. It follows then that our limited road facilities must be so controlled as to produce the maximum benefit to the community at large, a result which will arise directly from an increase in average speed of operation.

The Glasgow experiment in restriction of parking within the heart of the city is bold and imaginative, and is being studied with unconcealed interest by local authorities and road users alike. That it has brought advantages to the community at large is beyond doubt. The roads in the area concerned are now used for their basic purpose of movement—it is indeed surprising that so elementary a right should have been denied to the citizens and to the road users for so long. What might be the eventual repercussions of a system of restricted parking within the central area of a city? Based upon American experience, it could lead to a reduction in the importance and volume of central city business and in property values, and to the development of suburban supermarkets with satellite shops and adjoining car parks, and to general industrial development on city fringes. Whether we in this country can afford the space and cost of that development pattern is perhaps doubtful. It remains for the road passenger transport industry to watch the trend of development, to maintain and increase its flexibility, to apprehend and anticipate the resulting needs of the travelling public, and to take the fullest advantage of the opportunities afforded by the improved traffic flow to provide an increasingly high standard of public service and facilities.

Private Car Competition

The growth of private transport, referred to earlier in this paper, is likely to be accelerated by the hire-purchase and loan facilities now readily available. For as little at £63 down, a new and orthodox car backed by unequalled service facilities can be purchased virtually ex stock. True, there are monthly payments of £19 spread over a period of three years, to which, of course, must be added the costs of operation and maintenance. The typical motorist, and particularly the prospective motorist, does not accurately assess the cost which his motoring will involve. It is of interest therefore to study the actual cost of private motoring, whether for business or purely private purposes—the latter, of course, involving a substantially lower average annual mileage. The schedule (an abstract of which is reproduced) is issued by the Automobile Association and may be taken as an authoritative and accurate record of the cost of motoring today. (Table 4).

It will be seen that taking a typical economy car of up to 1,000 cc. capacity, the cost of motoring is 7¾d. per mile based upon a usage of 10,000 miles per annum (200 miles per week). In striking contrast, the cost of bus travel to the regular user of a 12-journey weekly ticket is approximately 1d. per passenger-mile. Add to that the reliability and comfort of modern bus services, and the absolute freedom from the problems and costs of parking, and it will be seen that the motorist is already paying for his independence a price quite unrelated to its value in practice—a price in fact far in excess of what he thinks.

We in the road passenger transport industry are too complacent about our publicity, and overmodest in declaring the extent to which road travel facilities have been developed to meet the needs of all, and the successful and strenuous efforts which have enabled road fares to be maintained at so low a level. Much more must be done to impress upon the public mind the fact that road passenger transport offers a high standard of travel facility at a price which no other form of travel can even approach. The price advantage in favour of the bus will increase quite substantially when ultimately and inevitably the price mechanism is brought into play to control the problem of the parked vehicle.

Motorways

Passengers will undoubtedly look for an improved standard of service and comfort on motorway routes, including possibly the provision of toilet and snack facilities on the vehicles, despite the likelihood that these same facilities will be available both day and night at frequent intervals along the motorways. Seating capacities and the ability to earn revenue will therefore tend to decrease, and should be offset by the relaxation of existing maximum length limits to at least 35 ft. In line with the cancellation of p.s.v. speed limits on motorways, comes the proposed increasing of the speed limit on all p.s.v.s from 30 to 40 m.p.h. which has received the support of the Minister of Transport. This relaxation is in every way justified for quite apart from the fact that the limit of 30 m.p.h. was to some extent disregarded, technical development both in design and in standards of maintenance of public service vehicles, has made the lower speed limit unrealistic if not indeed obsolete.

Company and Municipal Operation

Throughout the quite long history of passenger transport by road, there has been built up a healthy and close relationship between municipal and company operators from which undoubtedly both sides—and the travelling public in particular—have benefited. This relationship incorporates a basically competitive spirit, directed not at traffic extraction from either side, but towards the provision of better services, more attractive vehicles, and lower fares—in short, a relationship clearly in the public interest.

It has been said that a company runs for profit whereas a municipality runs for service. It is interesting to speculate on how in any type of business today profit can be made without giving service. It should be borne in mind, too, that included in the panel of three traffic commissioners are two members selected from the nominees of local authorities, and that the panel of commissioners are in fact the guardians of the public interest charged with the duty, inter alia, of ensuring an adequacy of service and a reasonableness of fares irrespective of who the operator may be.

The latest issue of public road passenger transport statistics reveals that in the year 1956-57 the municipal operators taken together produced a total net profit of 3.27 per cent of gross revenue, whereas the company operators produced a corresponding figure of 8.5 per cent of gross revenue. Comparison with the previous year shows an improvement of 0.55 per cent for the municipalities but a decline of 0.82 per cent for the companies. Are we to deduce from these figures that the municipalities are now taking a keener interest than formerly in the operation of passenger services on a profitable basis?

The profit motive can quite properly be applied to municipal transport operation. There is no good reason why a municipality which has invested capital in a transport undertaking backed by the rate fund, should receive any less financial return on that investment than would result from investing the same capital elsewhere, for in the latter event the rate fund would benefit and the annual demand on the ratepayers correspondingly reduce. In the absence of a transport profit, it follows that the ratepayers are subsidising the transport undertaking—an arrangement which could be open to criticism, for bus users and ratepayers are not necessarily the same people.

TABLE 4.—EXTRACT FROM A.A. SCHEDULE OF ESTIMATED VEHICLE RUNNING

	Total Cost (pence per mile)—10,000 miles per annum								
	Up to 1,000 cc.	1,001 *to* 1,265 cc.	1,266 *to* 1,500 cc.	1,501 *to* 1,750 cc.	1,751 *to* 2,000 cc.	2,001 *to* 2,250 cc.	2,251 *to* 2,500 cc.	2,501 *to* 3,000 cc.	*Over* 3,000 cc.
Standing charge	4.454	4.324	5.492	5.821	6.916	6.916	6.761	9.183	12,184
Running costs	3.123	3.162	4.088	4.240	4.126	4.602	4.820	5.078	6.436
	7.577	7.486	9.580	10.061	11.042	11.563	11.581	14.261	18.620
Petrol proportion (per mile) representing Excise Duty figures	.779	.974	1.117	1.197	1.111	1.207	1.290	1.401	1.754

Costs based on new car values.

The company operators carry a heavy burden of rural operation, and by their acceptance of that public duty the amenities of the town continue to be available to dwellers in the country areas. As a measure of the benefit given by the company operators to rural communities, it should be stated that in the Scottish Bus Group the receipts from no less than 21 per cent of the total mileage operated in 1957 were less than the average costs of the operating company, and losses on individual routes ranged from 1d. to 16d. per mile. In the full year the total loss to the Scottish Bus Group through the operation of these rural services was estimated at £465,000.

Looking back into history it seems clear that, probably without exception, the municipal operators were content to serve only their own area. In fact, even where their areas were contiguous, through operation was not always provided, and in some cases was prevented by the employment of different tramway track gauges. It was left to the companies with their pioneering enterprise to initiate and develop through services joining town to town, and this country owes to them a great debt for providing and maintaining the vast network of services and of connecting facilities which today we all accept as commonplace. It is essential, more than ever in the past, that both sections of our industry—company and municipal—should co-operate in their respective spheres to give together the best standard of service to the public at the lowest fares consistent with proper financial stability.

FERODO BRAKE LININGS

On Radio Telescope

TRACKING of the recent American moon rocket by the Jodrell Bank radio telescope was aided by Ferodo brake linings. To reduce wind vibration on the 250-ft. reflector bowl of the telescope when it is tilted to follow an object, a 300-ft. "bicycle wheel" stabilising track fitted behind the bowl runs on two inverted transport-type bogies employing Kirkstall axles with pneumatic tyres and Ferodo-lined brakes. By driving against the brakes and applying them in full when necessary, vibration in the 750-ton reflector is effectively damped and direction control is made extremely accurate.

A second Ferodo-lined brake employed on the instrument is probably the largest disc brake in the world. It consists of two jack-operated clamps made by B. Thornton, Limited, mounted in tandem to grip each side of the "bicycle wheel" stabiliser with strips of Ferodo brake lining each 32 in. long by 6 in. wide. Its purpose is to act as a parking brake to hold the reflector steady against the wind when the telescope is not in use.

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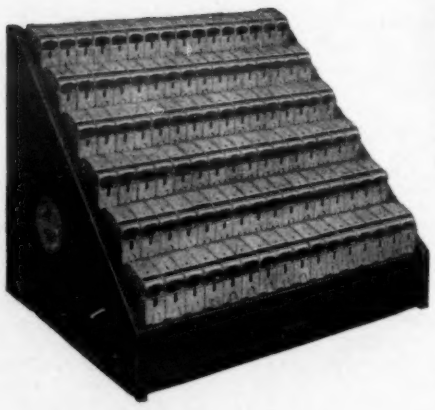

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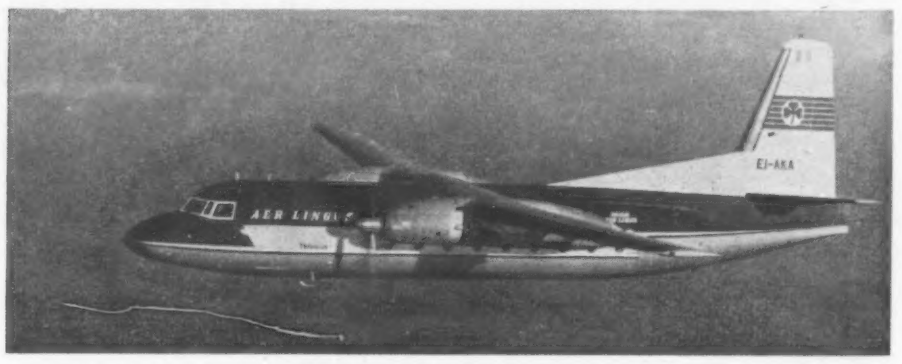
MODERN AIRWAYS and COMMERCIAL AVIATION SECTION

FRIENDSHIP ALOFT

Aer Lingus Demonstration Flight

USEFUL AIRCRAFT FOR GENERAL WORK

FROM next summer, as already recorded in MODERN TRANSPORT, Aer Lingus will be operating all its scheduled services with turbo-prop aircraft. The 13 aircraft concerned will be six Vickers Viscount 808s and seven Fokker F27 Friendships. The former will normally maintain the Dublin—London service and the Continental routes which are to be further expanded this year. The Friendships will take over the service which have latterly been scheduled for DC3 operation, namely those to Glasgow and Edinburgh, the Isle of Man, Manchester, Liverpool, Birmingham, Cardiff and Bristol, and Jersey. They also fly in winter to Paris, although the new summer operations through Paris to Zurich will be Viscount-operated as will most of the flights terminating at Paris. It should also be added at this point that one of the great advantages of the Friendship with its cruising speed little below that of the Viscount, is its ability to operate relief flights or to substitute the larger aircraft and to maintain schedule.



The first of the Fokker Friendships for Aer Lingus now carries the new tail markings recently introduced for Irish Air Lines

The first commercial flight by a Friendship in Europe was from Dublin to Glasgow on December 15 and since then the three so far delivered have operated a number of services as well as taking over responsibility for the Dublin—Paris route. The remaining four aircraft will be delivered by the end of April. Last week the second of the fleet visited London Airport to give demonstration flights—there had been relief flights over the Christmas period. In the main the Aer Lingus machines are being operated as 36-seaters, although they are actually the 40-seat version.

Purpose Behind Design

The Friendship prototype first flew rather more than three years ago and much has been done during the intervening period to refine the design features and overcome teething troubles. Much has been heard in recent years about suitable replacements for the Douglas DC3 and various designs have been produced and some of them built with that primary object in view. It is not we feel disrespectful to Royal Netherlands Aircraft Factories Fokker to say that its F27 is not a complete replacement for it is doubtful whether there can ever be one, but its close resemblance in many performance aspects has undoubtedly been the reason for the placing of orders by some 35 concerns, of which the great majority comprises scheduled airlines. These orders are being met by the factories at Amsterdam and Dordrecht in the Netherlands and by the Fairchild Engine and Airplane Corporation at Hagerstown in the United States. Under its licence agreement the American concern can sell throughout the Americas, with the exception of Brazil.

A view of the cabin during one of three demonstration flights from London

In looking for a design which would give the required performance in the restricted conditions under which many DC3s and the like operate, the Fokker engineers were influenced towards a high wing configuration for various reasons. By mounting the engines high above the ground it was possible to have large diameter airscrews (12 ft.) with consequential enhancement of take-off thrust. Then, too, the high wing provided improved lift characteristics while from the ground handling point of view there was the always attractive feature of easier loading and unloading of passengers and freight by reason of the low fuselage floor level. It was also, of course, important to produce an aeroplane which embodied modern design developments which gave speed, comfort and economy of operation, and this was a good reason to turn to Britain where the Viscount embodied so much of the successful work that had been done on turboprop aircraft up to that time. In the outcome some 100 British firms have made major contributions to the construction of the aircraft and it is estimated that the Friendship is a 60 per cent British production with its two Rolls-Royce Dart engines, Rotol airscrews, Dowty undercarriage and wide range of Dunlop equipment. Use of British engines and equipment already familiar in many cases to Viscount users could also be calculated as an attraction to potential buyers who sought as great a degree of standardisation as possible.

Performance

Wing area of the aircraft is 754 sq. ft. and the wing loading at maximum take-off weight of 35,700 lb. is 47.3 lb. per sq. ft., while with RDa6 engines the power loading is 10.4 lb. per e.h.p. It will be seen why performance figures based on a demonstration weight of 34,000 lb. show a rate of climb at sea level of 1,290 ft. per min. on two engines and 475 ft. per min. on one engine with a cruising speed of 236 knots at 20,000 ft. and a service ceiling of 27,700 ft. At maximum all-up weight the ground run for take-off is 2,060 ft. and distance to 50 ft. on two engines is 2,500 ft. Landing at the maximum permitted weight of 34,000 lb., the length from an altitude of 50 ft. is 2,140 ft. For those requiring an even better performance and prepared to accept the extra weight and reduced range involved, Dart RDa7 engines can be fitted giving an improvement of 550 ft. in take-off run and climb to 50 ft., an increased ceiling (30,000 ft.) and a higher cruising speed (260 knots).

Height of the aircraft from the ground to the top of the tail is 27 ft. 6 in. and its overall length is 75 ft. 9 in. The pressure hull is 53 ft. long and the diameter of the fuselage is 8 ft. 10½ in. Designed pressure differential is 4.16 lb. per sq. in. making possible maintenance of a cabin altitude of 8,000 ft. when at the cruising height of 20,000 ft. Freight and luggage capacity varies from 355 cu. ft. for the 32-seat version to 177 cu. ft. for the 40-seater. The main cargo space is forward on the starboard side of the aircraft with the buffet on the port side —in the 32-seat layout the buffet is located aft. At the rear of the aircraft the lavatory is placed on the starboard side opposite the passenger door with a small cargo compartment aft and also a wardrobe for passengers' coats.

Pneumatic System

Reference was made earlier to the wide range of Dunlop equipment that the aircraft contains. The brakes and braking system could probably be anticipated together with the Maxaret anti-skid units, all of them features which now verge on the commonplace, in the best sense of that word. Less usual, however, is the pneumatic system which provides for the operation of the undercarriage, nosewheel steering brakes and anti-skid units and, when necessary, for the emergency systems and warning devices. Two compressors, each weighing less than 12 lb., are mounted on the gearbox of each engine and these supply a system pressure of 3,000 lb. per sq. in. stored in pressure vessels and supplied through the appropriate pressure reducing valves and selectors to each particular service. Another feature of the Friendship to which reference should be made is the placing of the two integral fuel tanks in the outer wings. Their combined capacity is 1,130 imp. gal.

Seating in the cabin is in the two - and - two arrangement, a feature which we always welcome—the Viscount 808s of Aer Lingus also follow this practice for their 60 passengers. This layout provides adequate gangway space as may be seen from an accompanying illustration. The seats are not individually adjustable, but that would be a difficult luxury to justify on the type of flight for which the aircraft are primarily intended. There is, however, lavish provision of other amenities including individual reading lights and ventilation.

Demonstration Flight

The demonstration flight on which we travelled lasted some 40 min. and gave an opportunity to move about the aircraft in order to judge the variations in noise level and other things. There was that feeling of steadiness in the air which seems to be shared by all high-wing aircraft, and we recalled somewhat nostalgically flights made in the summer of 1933 in Fokker FVIIa and FXII aircraft, both of them very steady aircraft in their day if not as quiet as the new F27. That is indeed one of the features of the new machine. Seated aft in the cabin for take-off we were struck not only by the excellent rate of climb but also by the small amount of engine noise which reached us. Farther forward we found that there was appreciably more noise in line with the engines, but even there it was by no means obtrusive and quite comparable with other much publicised machines.

The seat pitch of just over 35 in. gave adequate room for movement of the legs and the view from the windows was excellent. Here of course is another of the attractions of the high-wing layout. Visibility over Kent was variable on the day of the flight but the snow-spattered fields on the North Downs reminded us of the cold outside and consequentially of the very adequate heating of the Friendship. We circled the Isle of Grain and turned back towards London Airport passing on the way over Croydon Airport, which is soon to be shut and where, between the wars, Fokker was a household name. There seems no reason why it should not become so again at the airports of Europe, or for that matter the other continents.

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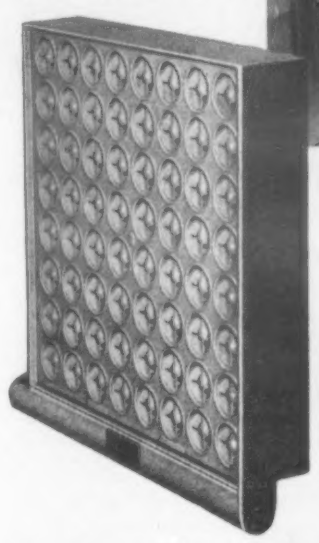

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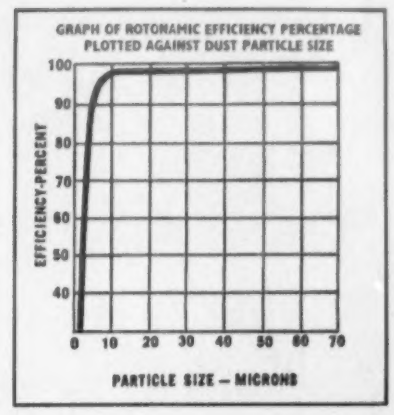

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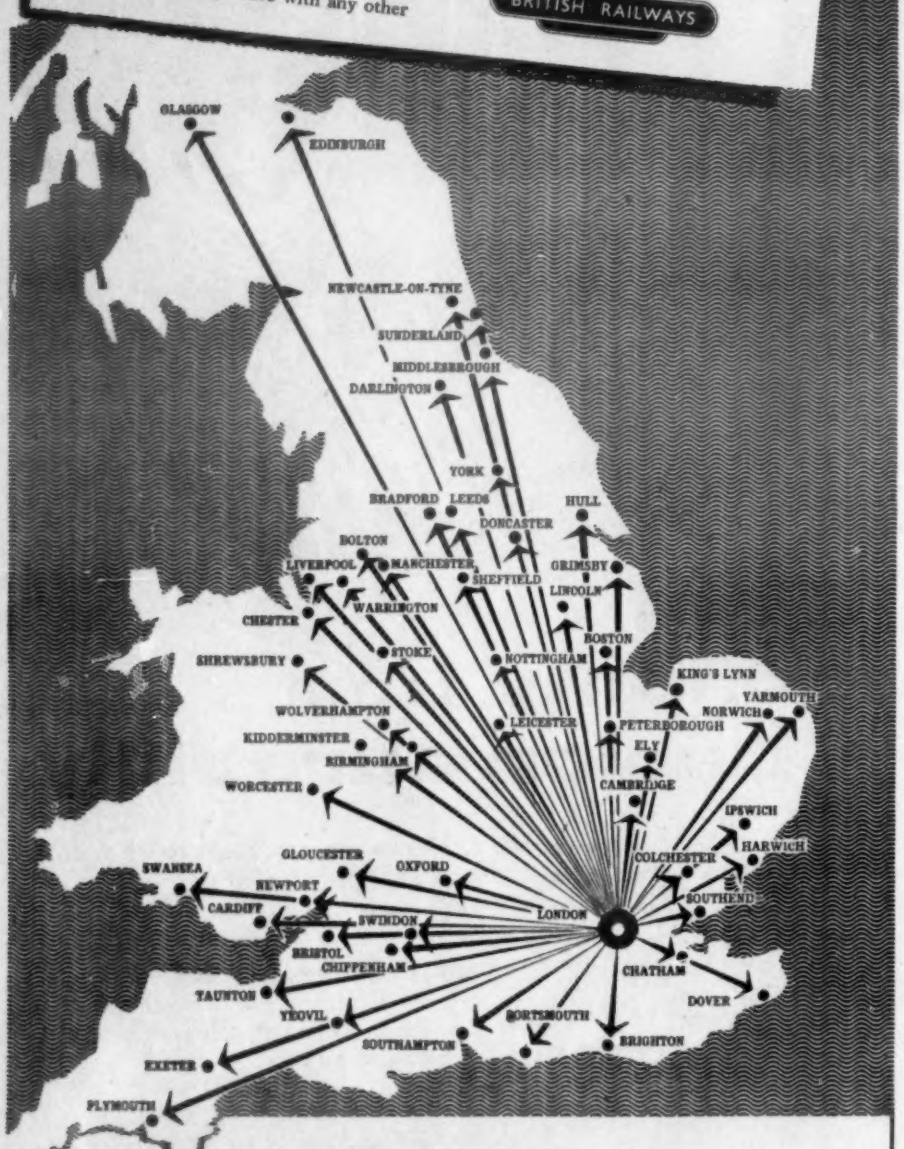
BRITISH RAILWAYS



BRITISH RAILWAYS EXPRESS FREIGHT

BOOK NOTICES

Trade and Technical

HOTELS AND RESTAURANTS IN THE BRITISH ISLES, 1959. (London: British Travel and Holidays Association, 64-65 St. James's Street, S.W.1. Price 6s.) The latest edition of this guide is bound, as usual, to be valuable not only to the holidaymaker but also to business travellers around the country. It should be made clear that, despite its title, the book does not set out to give any information about the Republic of Ireland. There are more than 4,000 hotels in the United Kingdom which are listed and also London and provincial restaurants.

* * *

HOLIDAY GAZETTEER. By Road from London. (Worcester: Littlebury and Co., Limited. The Worcester Press. Price 6d.) London Coastal Coaches, Limited, has had the bright idea of supporting the publication of a gazetteer calculated to encourage passengers by coach, coach-air, and coach-air-rail services. There is a number of articles aimed at the same target and a very comprehensive list of places in Britain and the operators serving them. Places of interest on the Continent are listed alphabetically with a few lines about their particular features.

* * *

OVERSEAS RAILWAYS—1958. (London: *The Railway Gazette*, 33 Tothill Street, S.W.1. Price 7s. 6d.) The 124 well-illustrated pages of the 1958 edition of this well-known annual contain the usual current reports, normally from the pens of general managers (or commissioners in Australia) of the affairs of railways from the Antipodes to the Caribbean, including the East, Africa, Canada and the Argentine. There is also a solitary European example, Coras Iompair Eireann, where diesel maintenance is dealt with by the deputy chief engineer (mechanical). The maps which accompany most of the articles are a distinctive feature.

* * *

LOCOMOTIVES D'HIER ET D'AUJOURD'HUI. By Vauquesal-Papin. (Paris: Editions des Arts et Manufactures, 12 Rue Ernest-Psichari, Paris, VIIe. Price 1,500 francs.) For those who read French (and there is a technical glossary) this is a most valuable account of some representative French locomotives ranging from an outside-framed 0-4-0 tender engine built by Robert Stephenson in 1834 for the Lyon and St. Etienne Railway to a 12-wheeled Alsthom 1,850-h.p. diesel-electric. Some 64 historical and modern steam engines and recent electric and diesel-electric types are described and illustrated.

* * *

PASSENGER TRANSPORT YEAR BOOK, 1959. (London: H. F. Maynard, Limited, Avenue Chambers, Vernon Place, W.C.1. Price 30s.) Considerable work has been put into the latest edition of this valuable reference book for the road passenger transport industry. The number of operators listed in the Isle of Man has, for example, risen from 1 to 55. The directory of overseas operators had to be expanded by 20 pages and a substantial number of names has been added both to the trade directory section and to the overseas review. It would be refreshing to find a new description for this volume, but when all is said and done the adjective "useful" best fits the bill.

* * *

100A1. (London: Lloyd's Register of Shipping, 71 Fenchurch Street, E.C.3.) Initially devised as a means of acquainting foreign clients with the work of Lloyd's Register, this bulletin, first published on a limited circulation basis in June, 1958, has provoked so much interest both at home and abroad that the second number, recently to hand, has been distributed more widely. Its appearance is indeed opportune in a period in which technical developments with actual or potential application to shipbuilding are multiplying. Typical of these are the introduction of reinforced plastics, the manufacturing processes of which are examined in bulletin No. 2, together with an indication of surveyors' problems connected therewith, also atomic energy plants, for the surveying of which a special land division of the society was established in 1950, when Harwell was in the experimental stage. Its association with atomic energy from these early days clearly assures shipbuilders of the most expert advice when power from this source is extended to the marine sphere.

* * *

WORLD RAILWAYS. (Fifth edition, 1958-59). Edited by Henry Sampson. (London: Sampson Low, Marston and Co., Limited, 25 Gilbert Street, W.1. Price 105s. net.) We welcome the appearance of a new edition of what has become in such a short time a work of reference to which those concerned with railways and their equipment must so often turn. The fifth edition, dated 1958-59, expands the value of the tabulated data of its predecessor concerning some 1,500 important railways with new headings which show 1957 financial results (revenue, expenses and operating ratio), average speeds of passenger and freight trains and gross ton-miles per freight-train-hour. Progress reports this year deal with the major systems; these summarise work on modernisation and outline future plans. The underground railway section which appeared in the third edition has been included in an elaborated form, bringing information up to date; the ever-useful particulars of locomotive and rolling stock manufacturers and their activities have also been revised to cover the latest developments. There is, however, a certain number of typographical errors. Special articles include those on mechanised marshalling yards, centralised traffic control and the activities of the International Union of Railways and the Association of American Railroads.

* * *

MODERN ROAD EMULSIONS. Third Edition. (London: Road Emulsion Association, Limited, 47 Victoria Street, S.W.1 Price 21s.) Since the last edition of this work was published in 1939, the general knowledge of bitumen emulsion has advanced considerably and the third edition, which has been edited by the technical committee of Road Emulsion Association, gives greater prominence to technical aspects and forms an authoritative work of value to all concerned with roads and road building. All phases are covered, including a short historical survey of the origins of the development and use of bituminous roadmaking materials.

* * *

LOCOMOTIVES OF THE SPANISH NARROW GAUGE RAILWAYS. Part One. (Middlesex: Industrial Locomotive Information Section of Birmingham Locomotive Club, 124 Byron Avenue, Cranford, Hounslow, Middlesex. Price 3s. post free.) Compiled by Mr. J. Morley, this 14-page quarto booklet gives locomotive information regarding a number of narrow-gauge railways in Northern Spain, with a diagram showing the intricacies of the area between Bilbao and Gijon. The latter place is served by the 5 ft. 6 in. gauge Renfe and also by the metre gauge F.C. de Carreño and the 4 ft. 8½ in. gauge F.C. de Langres en Asturias, a railway which has had a remarkable stock of four-coupled and six-coupled tank engines in its life since 1853. Eight narrow-gauge steam locomotives are illustrated.

* * *

RAILWAY SIGNALLING SYSTEMS. By John R. Day and B. K. Cooper. (London: Frederick Muller, Limited, 110 Fleet Street, E.C.4. Price 9s. 6d.) This is the third volume of the Mechanical Age Library which is being produced by this publisher with the object of setting out in simple terms for youthful enthusiasts the operating features and components of scientific and technical equipment. In this case the authors have used both line drawings and photographs to illustrate salient features and these are, by and large, well chosen, although we feel that the working of the somersault-type signal would have been clearer to the tyro had one of the boards at Melton Constable been shown in the off position. The chapter on automatic train control sets out the progress which has been made in this field leading to the adoption of the British Railways equipment but more might have been done to explain the many difficulties before it could be finally accepted—matters which seem to be beyond the understanding of the popular press.

★

A RIVER RESCUE

Incident at Pangbourne

WINTER motorway has its hazards and this was sharply brought home to two members of the Birfield organisation on Friday, January 9. Mr. L. Miller of Intermit, Limited, was driving Mr. W. B. Broadbent (assistant to the divisional director, Railway Division, Birfield Industries, Limited) down to Swindon when the car skidded on an icy patch of road at Pangbourne and plunged into the Thames at a point where it is 15 ft. deep. Mr. Broadbent managed to open one of the car doors and came to the surface, followed by Mr. Miller. Mr. Broadbent made for the bank, which he reached with great difficulty because he was still wearing an overcoat, but when he got to safety he saw that Mr. Miller was being swept downstream and was in difficulties. He therefore removed his outer clothing and went into the river again.

He reached Mr. Miller, who was still fully clothed, complete with overcoat, and after a great struggle he managed to tow him close to the bank where two lorry drivers threw a rope and hauled them ashore. A passing bus driver gave Mr. Miller artificial respiration and he was then taken to hospital where he was detained for two days. Mr. Broadbent, who was practically exhausted through his efforts, was taken to the police station and provided with a change of clothing before returning home. Mr. Broadbent was in the office as usual on the following Monday morning, and Mr. Miller has now also returned to work.

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SOCIAL AND PERSONAL

Scottish Railway Divisions

THE Scottish Area Board of the B.T.C. announces that it has appointed as divisional traffic managers designate, Mr. G. L. Nicholson to the Glasgow and South West division, and Mr. J. M. Fleming to the East Coast division, with headquarters in Glasgow and Edinburgh respectively. These appointments designate are the first step in a scheme of reorganisation designed to decentralise departmental management from regional headquarters down to a new divisional level, where commercial, operating and motive power activities will in due course be combined. Messrs. Nicholson and Fleming have hitherto occupied the posts of assistant to general manager and district goods manager, Glasgow, respectively.

* * *

Mr. Henry L. Hahn has been appointed sales promotion manager of the York Trailer Co., Limited, Corby. He was previously with F. Perkins, Limited.

* * *

Mr. D. L. Fytche, A.M.Inst.T., assistant traffic manager of the Trent Motor Traction Co., Limited, has been appointed traffic manager of the North Western Road Car Co., Limited. Before joining Trent in September, 1956, he was assistant divisional manager for the Merseyside area of Crosville Motor Services, Limited.

* * *

Mr. Frank Oldfield, appointed garage equipment sales manager of Laycock Engineering, Limited, in succession to Mr. Robert M. Walker, who retired at the end of last year, commenced his association with Laycock 24 years ago; latterly he has been assistant sales manager, Laycock automotive division. Following this period he was transferred to Birfield Industries, Limited, automotive division, and appointed Northern area sales manager, a post he has now relinquished.

Mr. F. Oldfield

* * *

Aircraft design activities of Vickers-Armstrongs (Aircraft), Limited, having been centred at Weybridge, changes in the aircraft design organisation of the company have been made. Mr. B. E. Stephenson becomes director of engineering, Mr. H. H. Gardner technical director and Mr. G. F. H. Hemsley chief engineer (aircraft).

* * *

Mr. P. C. Pinfield, previously manager, London stations, B.E.A., is to be appointed assistant traffic manager of the airline. He is to be succeeded in the first-mentioned post by Mr. P. F. Lewindon, manager, Germany.

* * *

Mr. W. Newland, previously personal assistant to the managing director, and also associate director in charge of export, becomes commercial director of Simms Motor Units, Limited, responsible for the Simms sales division in its entirety, including export and service. Mr. H. G. Dunn, M.I.Mech.E., M.S.A.E., an associate director, also joins the board.

* * *

The council of the Institution of Mechanical Engineers has decided to issue a new publication to be known as the *Journal of Mechanical Engineering Science*. It will be issued quarterly and will be available at subscription rates to members and non-members of the Institution. Its main purpose will be to provide a forum for specialised and scientific contributions in the field of mechanical engineering.

* * *

Mr. R. J. Hitchcock, hitherto labour relations officer, has been redesignated chief labour relations officer, London Transport. Mr. W. H. Mallett, A.M.Inst.T., has been promoted an officer of the Executive with the title of labour relations officer. Mr. F. E. Wilkins, M.B.E., T.D., senior executive assistant in the office of the Press and publications officer, has been appointed a principal executive assistant of the Executive.

* * *

Mr. H. M. Hunter, A.M.Inst.T., has been appointed assistant (special duties) to the general manager, Scottish Region. Mr. Hunter had served in various departments of the commercial manager's office before his appointment as head of the department in 1947. On nationalisation of the railways in 1948, Mr. Hunter was appointed public relations officer and the following year public relations and publicity officer of the Scottish Region.

* * *

New regulations have been approved by the Institute of Transport for the submission of a thesis for associate membership. Hitherto, permission to submit a thesis in lieu of the associate membership examination has been granted only to applicants (over the age of 35 years) who were already graduates of the Institute. The new regulations will make it possible for other candidates to apply for permission to submit a thesis, provided that they are over 35 years of age and have had at least five years' transport experience, and that they either (a) hold an appointment of executive responsibility in transport or (b) hold a professional qualification by examination acceptable to the Institute council.

* * *

Mr. H. Hoffman, O.B.E., M.Inst.T., shipping manager, transport division, Unilever, Limited, retired on January 16. Mr. Hoffman was apprenticed to Elder Dempster Co., Limited, and joined Lever Brothers, Limited, in Liverpool in 1913. With the merging of Lever Brothers and the Margarine Union, and the formation of the Unilever transport executive—now the transport division—he became administrative officer to that body, dealing with rail-road distribution and shipping problems. In 1938 he assisted in the formation of the movement control groups of the Royal Engineers, being gazetted major and, in 1939 crossed to France in advance of the B.E.F. In 1941 he was appointed a director, and later managing director, of General Freight Co., Limited, an associated company of Unilever, in addition to his duties with transport executive of Unilever. From 1946 onwards Mr. Hoffman became principally concerned with the shipping side of Unilever. He was chairman of the North Atlantic Shippers' Association; an executive member of the British Maritime Law Association and the British Shippers' Council; a member of the F.B.I. shipping panel, Traders Dock and Harbour Co-ordinating Committee, and International Chamber of Commerce. Mr. Hoffman is succeeded as manager of the shipping department by Mr. H. V. J. Brooks.

Mr. B. A. Coulson, traffic costing officer, York, since 1953, has been appointed principal traffic costing officer, York, B.T.C. Mr. Coulson joined the L.N.E.R. as a traffic apprentice in 1934.

* * *

Edgar Allen and Co., Limited, has appointed Mr. R. E. Sherwood manager of the steel department. He succeeds Mr. F. M. Darlow who joined the tramway department of the company in 1905.

* * *

Mr. H. O. B. Wooding, who has been acting as chairman of British West Indian Airways since Sir Errol dos Santos was appointed president, has now accepted the invitation of the board to become chairman.

* * *

Sir Halford Reddish has accepted an invitation to join the board of the Hawker Siddeley group. Chairman and managing director of the Rugby Portland Cement Co., Limited, he has become well-known as a speaker on industrial and economic subjects.

* * *

Details of the courses for management training which Management Training (P.E.), Limited, is holding at its training centre in London from January to July, 1959, are now available. They include as subjects the development of work study and its use by management.

* * *

As already announced, Mr. A. H. Croxton, hitherto chief superintendent of transportation, has been appointed principal executive officer (movement), Rhodesia Railways. This is one of two posts ranking immediately below that of deputy general manager. The new appointment took effect on January 1.

Mr. A. H. Croxton

* * *

With the approval of H.R.H. the Duke of Edinburgh, president of the Society, the Benjamin Franklin medal of the Royal Society of Arts has been awarded for 1959 to Mr. H. G. Nelson, M.A., M.I.C.F., M.I.Mech.E., M.I.E.E., managing director of the English Electric Co., Limited, "for his work in scientific industrial development." The award is made annually "to individuals who have attained early distinction, with promise of future achievement, in the promotion of arts, manufactures and commerce."

* * *

In a series of Government changes announced last week, Mr. Airey Neave, hitherto Joint Parliamentary Secretary, Ministry of Transport and Civil Aviation, transfers to the Air Ministry as Parliamentary Under-Secretary of State. He is succeeded by Mr. J. A. Hay, Conservative M.P. for Henley.

* * *

Last week the Southern Region Lecture and Debating Society had a talk from Mr. Godfrey Talbot, the B.B.C. commentator, in which he dealt entertainingly with the machinery of travelling with or ahead of royal tours to enable descriptions of events to be broadcast.

* * *

At the annual conference of the Public Transport Association at Folkestone on May 12-14 this year there are to be papers by Mr. A. J. White, general manager, Maidstone and District Motor Services, Limited, and Mr. F. H. Clayton, deputy general manager, Liverpool Corporation Passenger Transport Department.

* * *

We record with regret the death, at the age of 60, of Sir Claude Gibb. K.B.E. D.Sc., chairman of C. A. Parsons and Co., Limited. An Australian, he had joined the company as a fitter in 1923, but promotion followed rapidly. Since the war his company has played a leading role in the harnessing

Mr. George Brook (right), general manager, North Western Road Car Co., Limited, receives a 25-year service certificate from his chairman, Mr. T. Robert Williams

of nuclear energy. It was intended to make the presentation to Sir Claude Gibb at a meeting of the Institution of Mechanical Engineers today (Friday) of the 1959 James Watt International Medal, but in view of his sudden death these arrangements will of necessity have to be modified. At the meeting an appreciation was to be given of the work of Sir Claude, and arrangements announced for the transmission of the medal to Lady Gibb.

* * *

Mr. J. S. Scott has been appointed works manager, Darlington locomotive works, North Eastern Region, B.R.

* * *

We have been asked to point out that Alderman F. S. Smith, and not Councillor W. A. Stearn, is chairman of Southampton County Borough Transport Committee, as suggested in a correspondent's report on page 4 of our last issue.

* * *

Sir Leonard Lord, K.B.E., chairman of the British Motor Corporation, was to leave England on Thursday this week for a tour of B.M.C. factories and distributors in South Africa. A new assembly plant for Austin and Nuffield vehicles is now in full production in Cape Town. During his tour, Sir Leonard will visit every major distribution centre and will also discuss with local government officials the development of the 100-acre site recently acquired by B.M.C. at Salisbury, Southern Rhodesia.

it's time for maintenance. An I.C.I. trichloroethylene degreasing plant saves trouble and labour. It quickly removes all accumulated oil, grease and road dirt from mechanical parts, and leaves them clean, dry and ready for inspection. Road and rail transport operators find that trichloroethylene degreasing gives easier handling and inspection.

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One of the 94 diesel-electric locomotives supplied by Metrovick to Coras Iompair Eireann. These will serve all lines, and the order is the largest of its kind placed in Britain. Sub-contractors for mechanical parts: Metropolitan-Cammell. Diesel engines by Crossley Bros. Ltd.

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IMPORTANT CONTRACTS

More Orders for B.R.

MORE orders for the railway modernisation programme have been placed by the British Transport Commission. They include 69 main-line diesel locomotives of various horsepower, 124 sets of electrical apparatus for the conversion of the existing Liverpool Street—Chelmsford—Southend electric trains to operate on the 50 cycles a.c. system, 124 new main-line passenger coaches with improved amenities, and 54 wagons for the conveyance of big loads. Of the 69 main-line diesel locomotives, 49 are to be delivered this year as part of the accelerated programme for the introduction of diesel traction on British Railways. They comprise 10 locomotives of 2,000 h.p., 20 of 1,365 h.p., nine of 1,160 h.p. and 10 of 800 h.p., and have been ordered following assurances of completion in 1959. Delivery of the remaining 20 locomotives of 1,550 h.p. will begin next year. These are for the Southern Region, where they will be employed mainly in hauling freight traffic, and on passenger services which cannot be operated by electric multiple-unit trains or electric locomotives. It is hoped to effect the changeover of the Liverpool Street—Chelmsford—Southend electric service in 1960, when some of the rolling stock now being built for the a.c. system will be used as a temporary replacement for some of the present trains on these services while the latter are converted. Features to be included in 124 new main-line passenger coaches include improved heat and sound insulation, better lighting, and more attractive interiors with lighter plastics finishes and brighter upholstery fabrics. The windows of first-class coaches will be double-glazed. The London Midland Region is to have 81 coaches, the Eastern and North Eastern Regions 13, and 30 are for the Western Region. The 54 freight vehicles are of four special types, designed for carrying difficult loads for which standard wagons are unsuitable. Details of the orders are:

MAIN-LINE DIESEL LOCOMOTIVES

Firm	*Description*
Brush Electrical Engineering Co., Limited	20 Type 2, 1,365 h.p.
English Electric Co., Limited	10 Type 4, 2,000 h.p.
British Thomson-Houston Co., Limited	10 Type 1, 800 h.p.
Birmingham Railway Carriage and Wagon Co., Limited	9 Type 2, 1,160 h.p. and 20 Type 3, 1,550 h.p.

ELECTRIC TRAIN EQUIPMENT

Metropolitan-Vickers Electrical Co., Limited	124 sets of electrical equipment for the conversion of the Liverpool Street—Chelmsford—Southend multiple-unit trains to the 50 cycles a.c. system.

ROLLING STOCK

Metropolitan-Cammell Carriage and Wagon Co., Limited	48 corridor first-class coaches (10 for the London Midland Region, eight for the Eastern and North Eastern Regions, and 30 for the Western Region); and 45 corridor composite coaches for the London Midland Region.
Gloucester Railway Carriage and Wagon Co., Limited	20 corridor second-class brake coaches for London Midland Region; and five corridor composite brake coaches for the Eastern and North Eastern Regions.
Birmingham Railway Carriage and Wagon Co., Limited	Six open first-class coaches for the London Midland Region.
Standard Railway Wagon Co., Limited	18 40-ton flat trolley wagons for the London Midland Region, and 15 50-ton special bogie-bolster wagons for the Western Region.
Tees Side Bridge and Engineering Works, Limited	2 40-ton flat-trolley wagons for the London Midland Region.
Cambrian Wagon and Engineering Co., Limited	27 38-ton low bogie wagons (Rectanks) for the Eastern and North Eastern Regions.

Viscount for Sudan Airways

Vickers-Armstrongs (Aircraft), Limited, has announced the sale of a Vickers Viscount 810 series aircraft for operation by Sudan Airways. Delivery will be in May of this year. The total number of Viscounts now sold is 405, and the number of airlines with Viscounts in operation or on order is 41.

Irish Shipping Diesel Conversions

Irish Shipping, Limited, has awarded a contract to John Readhead and Sons, Limited, South Shields, for the conversion of its two 7,500-ton ships, *Irish Pine* and *Irish Oak* from steam to diesel propulsion. R. and W. Hawthorn, Leslie and Co., Limited, will supply the 4,400-h.p. diesels, which will provide a speed of 14 knots.

Iran Order for Road Tankers

A contract for the supply of 60 diesel-engined road tankers valued at over £250,000 has been placed with Leyland Motors, Limited, by the National Iranian Oil Company. The vehicles, which are required for fuel distribution throughout the mountainous country of Iran, will augment a fleet of over 400 Leyland vehicles already operated by N.I.O.C. All 60 new vehicles will be Leyland Super Hippo six-wheeled haulage models designed for a gross vehicle weight of 24 tons. The oil company's last order, also for 60 Super Hippos, has now been completed.

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TENDERS INVITED

THE following items are extracted from the Board of Trade Special Register Service of information. Inquiries should be addressed, quoting reference number where given, to the Export Services Branch, Board of Trade, Lacon House, Theobalds Road, London, W.C.1.

January 30—Portuguese East Africa.—Ports, Railways and Transport Department for 100 WHEEL and AXLE ASSEMBLIES for railway wagons (10 by 5). Tenders through local agents to Ports, Railways and Transport Department, Lourenco Marques. (ESB/1112/59.)

February 5—Union of South Africa.—Cape Provincial Administration, Divisional Council of Piketberg for roadmaking machinery including one 23,000/25,000 lb. MOTOR GRADER, one 20,000/23,000 lb. MOTOR GRADER, two 6-ton payload diesel-driven MOTOR TRUCKS, one WELDING VAN (4-wheel drive), one 1,200-gallon truck-mounted WATER SPRINKLER, one class 3 CRAWLER TRACTOR with hydraulic angle dozer and tractor-mounted hydraulic ripper, one 1,000 lb. light MOTOR VAN, one 12/14 ton self-propelled ROLLER, 3 two-berth CARAVAN TRAILERS, one mechanical ROTARY SWEEPER, two 200-gallon WATER TANK TRAILERS and one tractor/semi-trailer WATER CART outfit. Tenders to Secretary, Divisional Council Office, Piketberg, Cape Province. (ESB/32075/58.)

February 6—Laos.—International Co-operation Administration for 10 truck STATION WAGONS, 4-wheel drive, 9 ft. 11 in. wheelbase, left-hand drive. Tenders to Government Purchasing Office, Royal Laos Government, Vientiane, Laos. (ESB/31580/58/ICA.)

February 11—Ceylon.—Ceylon Transport Board for lead acid BATTERIES of the 6-volt and 12-volt types suitable for heavy-duty use in petrol- and diesel-engined buses in tropical climates where the ambient temperature range is approximately 75 to 90 deg. F. In general batteries offered should be constructed so that they satisfy the requirements of the S.A.E. or A.A.B.M. Standards. Tenders to the Chairman, Tender Board, Ceylon Transport Board, Kirula Road, Narahenpita, Colombo, Ceylon. (ESB/375/59.)

February 18—Pakistan.—International Co-operation Administration for 800 single-deck, two-axle, diesel-engined BUS CHASSIS. Tenders to the Director General, Department of Supply and Development, Frere Road, Karachi. (ESB/1189/59/ICA.)

February 26—Australia.—Queensland Railways for 20 RAIL-CARS (10 two-car units), each unit consisting of one passenger and one passenger-luggage car, each car being powered. Tenders to the Office of the Commissioner for Railways, Brisbane. (ESB/31650/58.)

SHIPPING and SHIPBUILDING

First New Gas Turbine Ship

LAST week the 9,250 deadweight tons ore carrier *Morar*, built for Scottish Ore Carriers, Limited, by Lithgows, Limited, ran her trials on the Clyde. This is the first large ship anywhere in the world to have free-piston gas turbine propulsion. The *Morar* has three G.S.34 gasifiers supplied by the Free Piston Engine Co., Limited. The turbine is reversible, having six ahead and two astern stages. The astern turbine is incorporated in the main casing. The whole of the machinery, installed aft, is hydraulically controlled from a central point. Developing 2,500 i.h.p. in service the vessel will have a speed of 11 knots. One of the principal merits of this form of propulsion is the ability of the ship to continue at reduced speed if one gasifier fails, also the reduced weight and space occupation compared with a diesel installation.

Joint Hull—Germany Service

SEVEN sailings a fortnight, each on a different day, are now maintained between Hull or Goole and German ports following an agreement between Associated Humber Lines and Argo Reederei Richard Adler und Söhne, of Bremen. This co-ordination into a joint service offers traders the maximum useful frequency of sailings.

New Lighters for Colombo

CARGO handling operations in the ill-famed Port of Colombo will, it is hoped, be speeded up considerably when 100 new lighters ordered by the Port Cargo Corporation arrive—within the next ten months. The first 50 are expected to be delivered in six months' time. The chairman of the Port Cargo Corporation recently visited Hong Kong to urge that their delivery be expedited.

Looking Ahead at Avonmouth

TO expand facilities at Avonmouth Docks a new transit shed costing £500,000 has been approved by Bristol City Council. A long-term policy also approved by the council provides for the acquisition, when it becomes available, of a substantial area of land on the Somerset side of the River Avon between the mouth of the river and Portishead Docks. This plan may involve the building of a new dock.

Forth Ferry Proposal Fails

PROPOSALS for transfer of the Queensferry vessels to revive the Burntisland—Granton service on completion of the Forth Road Bridge are not practical, it is stated. Burntisland Town Council hoped to secure this transfer but has been advised by William Denny and Brothers, Limited, the Dumbarton shipbuilder, that the vessels now on the Queensferry service will not be suitable for Burntisland—Granton. The cost of providing two new ships for that ferry would be in the region of £600,000 which Denny Brothers could not provide. If vessels were provided independently, however, the company would be prepared to operate as manager.

Black Smoke Fine

A FINE of £25, with 10 guinea costs, was imposed on Clan Line Steamers, Limited, at Grays, Essex, in what is believed to be the first case of its kind under the Clean Air Act, for excessive emission of smoke from a cargo vessel at Tilbury Docks on October 2 last year. The company pleaded guilty. There were 31 complaints from local householders of the oily and smutty atmosphere, lasting for almost an hour. On behalf of the owners it was explained that a check valve cover joint blew out, creating a situation of danger with high pressure steam escaping. The engineers, it was stated, had to "flash up" a fresh boiler, and burning cold oil caused the black smoke. The forced draught to produce proper combustion had not been adjusted as quickly as perhaps it could have been owing to the emergency.

London Scottish Line Stopped

DIRECTORS of London Scottish Lines, Limited, issued the following statement last week: "The company's service has been suspended during the past four weeks owing to dock labour difficulties at the berths in London. The frequency of dock labour trouble over the past few years has involved the company in losses which seem no longer worth incurring and consequently the company's future activities are now under the directors' consideration." London Scottish Lines, which owns two vessels, was formed in 1946 (see MODERN TRANSPORT, December 31, 1949) to combine the interests of the Scottish London shipping conference, comprising the Carron Company, Clyde Shipping Co., Limited, the General Steam Navigation Co., Limited, and the London and Edinburgh Shipping Co., Limited. Its head office is in Leith and services are scheduled between Glasgow and London and Leith and London. The London berth is at the Jetty, London Docks. It is possible that a road service will be offered in lieu.

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FINANCIAL RESULTS

NOTES on the trading results, dividends and financial provisions of companies associated with the transport industry are contained in this feature, together with details of share issues, acquisitions and company formations or reorganisations.

Pressed Steel

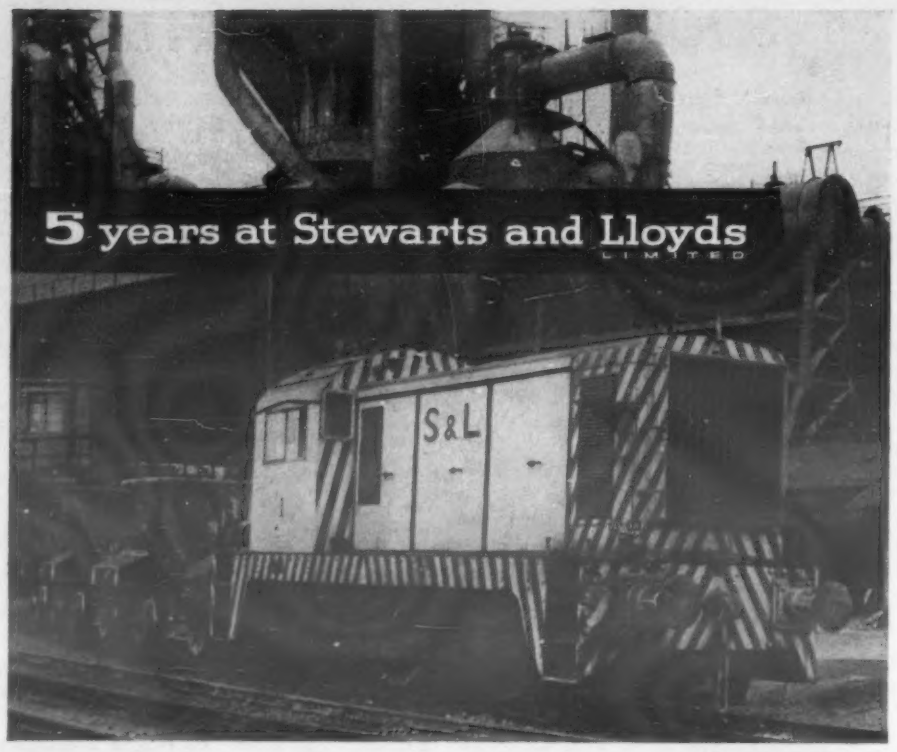
The Pressed Steel Co., Limited, has formed a subsidiary company to represent it in the European Common Market countries. The name of the company is Pressed Steel Société Anonyme and its headquarters and showroom are in Brussels. A prime objective will be to promote the sale of car bodies and refrigerators in Europe.

Expanded Metal

A further step in the progress of the Expanded Metal Co., Limited, has been the recent acquisition of all the ordinary and preference share capital of the Glasgow Expanded Metal Co., Limited, which follows the taking over of the Cressall Manufacturing Co., Limited, and the founding of a subsidiary company in Canada.

F. Perkins

The directors of F. Perkins, Limited, announced on Monday night that an approach had been made to acquire the whole of the issued share capital. Negotiations are proceeding, the results of which will be announced in the very near future. No name of the prospective buyer was then announced but it has been stated that it is Massey-Ferguson. F. Perkins was registered in 1932. In 1957 it suffered a sharp setback in profits, one of the factors being the increasing manufacture by vehicle builders of their own diesel engines. With this in mind the board stated some time ago that new products were planned. In pursuance of this policy, the company announced its first new product at the end of last year. This was for the production of outboard motor engines in partnership with the Oliver Corporation of Chicago. The latest Massey-Ferguson large tractor employs a Perkins engine and the company recently announced that it intended eventually to construct its tractors in their entirety.



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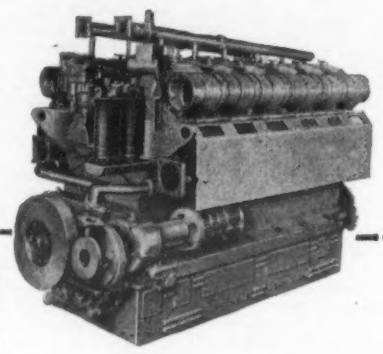
DIESELS
128–2300 b.h.p.

Sixty-five per cent of all steelworks diesel locomotives, from 38 to 52 tons, at work in Great Britain, are powered by Paxman diesels.

At Stewarts and Lloyds Limited alone, sixteen Paxman engines have each given an annual average of 2,400 hours sterling service over the past five years.

The total hours in service of these locomotives are as follows:

6 locomotives at Bilston	126,300
6 locomotives at Corby	121,000
4 locomotives at Clydesdale Works, Mossend	28,666



DAVEY, PAXMAN & CO. LTD.
Colchester, England
A member of the Ruston Group

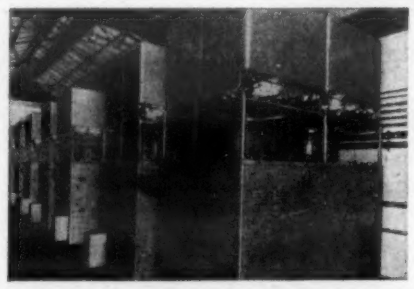
148

IN TRACTION SERVICE IN 18 COUNTRIES ... Hewittic RECTIFIERS

the converting plant used by the World's principal railways

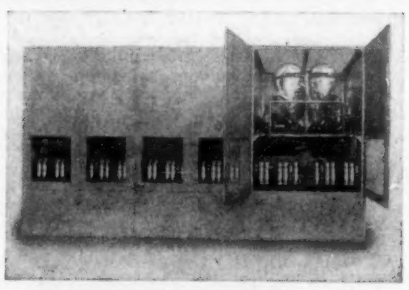
BRITISH RAILWAYS
SOUTHERN REGION

One of 28 substations equipped with Hewittic Rectifiers by the British Transport Commission for the Southern Region of British Railways. The photograph shows Wimbledon substation with one wall cut away to show the two 2,500 kW rectifiers in this half of the building.



LONDON TRANSPORT RAILWAYS

The 4,000 kW Bond Street substation, equipped exclusively with Hewittic Rectifiers. The plant comprises four 1,000 kW combined rectifier and enclosed air-cooled transformer units. This company is also responsible for the supply and installation of all A.C. and D.C. control gear. Some 90,000 kW Hewittic Rectifiers have been supplied to the London Transport Executive.



CANADIAN NATIONAL RAILWAYS

The electrified section of the Canadian National Railways, comprising some 70 track miles in the vicinity of Montreal Terminal is supplied with D.C. by Hewittic Rectifiers in two 3,000 kW substations at Central Station and Saraguay. The photograph shows one of the four 1,500 kW equipments in service. These are designed for operation at 3,000 volts, D.C.

HACKBRIDGE AND HEWITTIC ELECTRIC CO., LIMITED
WALTON-ON-THAMES - SURREY - ENGLAND
Telephone: Walton-on-Thames 760 (8 lines) *Telegrams: "Electric, Walton-on-Thames"*

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